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The National Health Program—Present Status*

ABEL WOLMAN, DR.ENG., F.A.P.H.A.
Professor of Sanitary Engineering, Johns Hopkins University, Baltimore, Md.

A YEAR ago your speaker in his Presidential address, "A Century in Arrears," made the error of indulging in quantitative analysis of certain matters concerning the public health. A lapse of 100 years in recognition of important undertakings in the public health field was emphasized. The penalty for such an analysis was not long in coming, for today the program committee suggests that the estimates of progress or of delay be brought up to date for the past year.

The evaluation of accomplishment in a century is a far simpler assignment than the determination of the particular fronts on which real changes have occurred in a period of 12 months. Much has happened since October, 1938, but the task of assigning permanent values thereto is difficult. All that can be done today is to rehearse in as brief compass as possible what appear to be the important steps forward in discussion, legislation, or administrative accomplishment. In all these sectors the past year has been surprisingly fruitful.

* Read at a General Session on Medical Care and the National Health Program, of the American Public Health Association, at the Sixty-eighth Annual Meeting in Pittsburgh, Pa., October 18, 1939.

ACTIVITIES OF THE AMERICAN PUBLIC HEALTH ASSOCIATION

The executive board of the A.P.H.A., following the Kansas City mandate of the membership, appointed a committee of Fellows of the Association to cooperate with the Interdepartmental Committee of the U. S. Government, with the American Medical Association, with the American Dental Association, the National Organization for Public Health Nursing, the Conference of State and Territorial Health Officers, and other agencies, for the purpose of translating certain accepted principles of the Association in the national health program, into effective action, whether of an administrative or legislative character.

This committee met in Washington on November 19, 1938, at the request of Miss Josephine Roche, Chairman of the Interdepartmental Committee, for extended conference. All members of the committee were present. For purposes of the record these included: Abel Wolman, Dr.Eng., Chairman, J. N. Baker, M.D., Louis I. Dublin, Ph.D., A. T. McCormack, M.D., H. S. Mustard, M.D., John L. Rice, M.D., F. J.

Underwood, M.D., and, ex-officio, E. S. Godfrey, Jr., M.D., and Reginald M. Atwater, M.D.

Following these and other conferences, the recommendations were presented to the Executive Board of the A.P.H.A. for acceptance. Such acceptance has since been granted. The recommendations are here repeated without the supporting data which the committee presented, but which may be found in the official records of the Association.

1. It is certainly theoretically desirable that a single state agency should be made administratively responsible for carrying out all the provisions of the National Health Program which may be enacted into law.

2. In the initiation and development of the program, wide latitude should be given to the states in the definition of the population to be served, in the selection of the method of providing medical service, and in other important phases of the proposed program. We believe that similar latitude should be provided with regard to the method of raising funds in the states to accomplish approved objectives.

3. The fundamental objectives involved are, first, conservation of health and vitality and, second, reduction of the rôle of sickness as a cause of poverty and dependency. With this in mind, it supports the concept that Recommendations 1, 2, and 3 of the Interdepartmental Committee (the expansion of public health and maternal and child health services, the expansion of hospital, clinic, and other institutional facilities, and the provision of medical care for the medically needy) should have priority in initiation.

4. Recent experience demonstrates that the Social Security Act provisions for aid to the states for health work provide a suitable framework for the expansion of preventive health services.

5. Any state program to be approved for federal aid should contain adequate provisions for the maintenance of high personnel standards and that payment of such federal aid to state agencies should be withheld when it is found that substandard services are being furnished. Similar policy should obtain with respect to state aid to local areas within a state. The appropriate federal administrative authorities should have power to establish minimum standards through rule and regulation after consultation with competent advisory professional bodies.

6. Careful study will be necessary to perfect administrative regulations to cover the details concerned with the provision of medical services, so as to assure a high level of quality. We believe that standards of medical practice should not be written into basic law. Federal aid should be conditioned on inclusion within the state plans of adequate safeguards for maintaining appropriate standards.

7. The extension and improvement of public health services in general throughout the country requires complete integration of health services of the federal government under one cabinet officer, preferably a Secretary of Health.

During 1939, the Association continued sessions with key representatives of a number of the federal and state agencies interested in the development of the National Health Program. These culminated in the appearance of your President before the Senate Committee on Education and Labor on May 4, 1939, to present a statement of the position of the American Public Health Association with reference to the National Health Bill of 1939, S. 1620. A summary of that statement appears in the JOURNAL of the Association for June, 1939, pages 686 to 688, inclusive.

The Association approved in principle the major aspects of the National Health Program. It pointed out, however, important details or principles in which the proposed legislation differed from the principles accepted and already enunciated by the Association. The essential agreements and exceptions noted in this statement are not again recorded here, for they may be read in detail in the JOURNAL already referred to and in amplification in the testimony before the Senate Committee, now available in printed form.

CONGRESSIONAL ACTION

Although several acts affecting the program for improvement of the public health of the nation were introduced into the Congress during 1939, the most significant and comprehensive of these is Senate Bill 1620, providing for the general welfare by enabling the several

states to make more adequate provision for public health, prevention and control of disease, maternal and child health services, construction and maintenance of needed hospitals and health centers, care of the sick, disability insurance, and training of personnel. The bill was introduced in the Senate by Senator Robert F. Wagner of New York on February 28, 1939.

The National Health Bill translated into concrete legislation the recommendations for action which had been developed from some years of inquiry. It extends the procedure of grants-in-aid developed in various titles of the Social Security Act, on the assumption that this procedure permitted the widest latitude to the states in the development of their own plans consistent with the needs of their own people. The bill further provided grants to establish, expand and improve state programs for

a. Child and maternal health
b. General public health services and investigations
c. Construction of needed hospitals and health centers
d. General programs of medical care
e. Insurance against loss of wages during periods of temporary disability

The administration of the purposes of the Act is vested in the existing federal agencies: The Children's Bureau, the Public Health Service, and the Social Security Board.

The bill does not establish a system of health insurance, or require the states to do so. Although the bill does not include such a program, common assumption that it does still persists.

The financial implications of the proposed act are briefly set forth in Table 1. A review of this table indicates that the present 1938 authorizations for health purposes under the Social Security Act are approximately $17,000,000. The proposed authorization under S. 1620 for the fiscal year 1940, was $98,250,000. An authorization should be distinguished from an appropriation, since the former is an indication of Congressional intent, while the latter is a statement of budgetary allotment. In other words, the authorizations suggested in S. 1620, even if this bill had been passed, would have to be translated into appropriations by subsequent Congressional and budgetary action. The authorized and the appropriated amounts are rarely the same.

The proposed legislation rests upon an agreed need for a national health program in which the following assumptions were dominant:

1. The health of the people is a matter of public concern.
2. Ill health is a major cause of suffering, economic loss, and dependency.
3. Good health is essential to the security and progress of the nation.

PRELIMINARY REPORT FROM THE COMMITTEE ON EDUCATION AND LABOR

The Committee on Education and Labor of the Senate appointed a sub-committee to study the bill. This sub-committee held numerous public hearings in which a large volume of testimony and supplementary information was acquired. The committee on August 4, 1939, reported that it is in agreement with the general purposes and objectives of S. 1620. It wished to give this legislation, however, additional study and to consult further with representatives of lay organizations and of the professions concerned. The sub-committee intends to report out an amended bill at the next session of Congress convening in January, 1940.

The report of the sub-committee released in August, 1939, as Report No. 1139, is replete with important observations on many of the accepted and controversial features of the National Health Program. The document deserves careful review and analysis by every individual interested in public health progress in the United States.

TABLE 1

Present Appropriations for Health Purposes under the Social Security Act and Appropriations Proposed to Be Authorized by S. 1620

Purpose	*Present Authorization under the Social Security Act*	*Proposed Authorization under S. 1620*[1] *Fiscal Year 1940*
Title V:		
Part 1: Maternal and child health services	$3,800,000	$ 8,000,000
Part 2: Medical services for children, including crippled children	2,850,000	13,000,000[3]
Part 5: Administration, investigations and demonstrations, etc.	425,000	2,500,000
Title VI—Public Health work and investigations:		
Part 1:		
Payments to States	8,000,000	15,000,000
Administration, studies, demonstrations, etc.		1,500,000
Part 2: Investigations	2,000,000	3,000,000
Title XII:		
Grants for general hospitals		8,000,000
Grants for mental and tuberculosis hospitals		(2)
Administration, etc.		
Public Health Service		1,000,000
Public Works Administration (etc.)		(2)
Title XIII:		
Grants for medical care		35,000,000
Administration		1,000,000
Title XIV:		
Grants for temporary disability compensation		10,000,000
Administration		250,000
Total	$17,075,000	[4]$98,250,000

1—These amounts replace, and are not additional to, the amounts authorized by the Social Security Act.
2—A sum sufficient to carry out the purposes of (this part of) this title.
3—Of which $4,000,000 in the fiscal year 1940, $5,000,000 in the fiscal year 1941, and so much as the Chief of the Children's Bureau deems necessary in succeeding years, are to be allotted "for service to crippled children and other physically handicapped children in need of special care."
4—Total of limited expenditures authorized.

Even a brief summary of all of the features of the report would be impracticable of presentation today. One cannot escape, however, the temptation to record some of the outstanding observations in the report. The speaker takes the liberty of quoting some of the more striking comments below:

1. "The evidence on needs, in urban and in rural areas, is overwhelming, as may be evident to anyone who will examine the record.

2. "There are various factors which explain why large proportions of the population fail to receive the medical and health services they need. So far as community services are concerned, there is often a lack of understanding or experience as to the benefits to be derived from public health and related services and, perhaps more important, there is lack of financial resources. So far as services for individuals are concerned, there is, among other factors, ignorance as to the benefits of modern medical care, reliance upon unsuitable methods of care, distance from practitioners and facilities, etc. But while these particular factors play a part in the case of services for individuals, we are convinced from the evidence placed before us that the major reason is lack of financial ability on the part of large proportions of the population—as individuals, as groups, or as members of committees—to meet the costs of needed services.

3. "The fact that a considerable proportion of general hospitals are being used to far less than their capacity in some places does not alter the basic need for additional facilities, or for facilities within the financial resources of particular groups of people, in other communities.

4. "The irregular and unpredictable occurrence of sickness, and consequently of expenses for medical treatment, tends to create a new class of dependent or needy persons, so that, in addition to the indigent, people everywhere are beginning to characterize a large proportion of our population as the 'medically indigent' or the 'medically needy.' These are persons who are self-supporting in every respect except as regards need for elaborate or expensive medical care; they include tens of millions of people, on farms and in cities, above the relief level. Yet, though these are people who need no public assistance for their ordinary support, their health and medical needs are as much the concern of Government as are the needs of the indigent.

5. "The long history of this subject shows that these problems do not solve themselves by being ignored; neither do they cease to exist by being either ignored or denied. Nor, as a long history of special studies makes plain, are these problems new or the result of an economic depression. They were with us in the 1920's, as Dr. Wilbur's Committee on the Costs of Medical Care fully recognized, and they are still with us today. These problems must be faced squarely and solved on a basis which not only safeguards the quality of medical care but also preserves the dignity and self-respect of the people who are to be served.

6. "There is no escaping the fact that the costs of sickness are a heavy burden on large portions of our population, that modern medical care is of necessity elaborate and expensive in many cases of serious illness, that the costs may be out of reach for people with small incomes, and that the burden should not be left so largely on the practitioners, hospitals, and voluntary organizations as it is today. We must provide substantial solutions, as we believe we can, which will be beneficial alike to patients, to the entire public, to practitioners, to the hospitals, and to the related institutions and organizations.

7. "This bill does not propose a new departure or a new type of activity for the federal government. Participation in health services by the federal government is as old as the nation itself. Federal coöperation with the states in safeguarding health and strengthening state and local health services has an unbroken history of 150 years. The bill before us proposes only to lay out a long-range and systematic program on a basis for carrying on old and traditional activities in a sound and efficient manner.

8. "It is our opinion that the administration and operation of health services should be left to the local communities and to the states, and that the federal government should not control or dictate to the local communities or states in the management of these functions. But the federal government cannot be indifferent to remediable deficiencies or inadequacies in the provision of services that are necessary to health. It should take steps to aid the states and, through them, the local communities, in the provision of necessary health services to their inhabitants. The primary opportunity for the federal government is to give financial and technical aid to the states.

9. "Disease germs and the economic effects of sickness do not respect state lines. The opportunities for the spread of disease are increased by modern methods of transportation and by the mobility of population. The citizens of one state cannot be safe from communicable disease so long as such disease prevails among the citizens of other states. One state cannot stamp out tuberculosis among its people unless the disease is also stamped out in neighboring states. One state cannot meet all the costs of improved health services and cannot protect itself against the burdens of dependency caused by sickness, disability, or premature death unless other states also participate in a common effort against disease. But together, and with the aid of the federal government, an effective and concerted war can be waged against disease.

10. "A long-range health program offers a challenge not only to our humanitarian impulses but to our economic judgment; it offers an opportunity to balance the health budget of the nation.

11. "Coöperative federal-state health and assistance programs now in operation only emphasize the need for a carefully planned, well coördinated, long-range health program, adequately financed, so as to assure that we will make those efforts and expenditures that will bring the maximum return, especially in the prevention of disease and disability. It is to such a balancing of the health budget that the National Health Program and the present legislation is directed."

In addition to this brief summary of some of the committee's findings, reference should also be made to the careful

discussions which the committee devotes to such special problems as the general principle of federal aid to states, the problem of variable grants and matching proportions, the income limit of populations to be aided, the importance of medical education and research, the significance of health education of the public, the administrative provisions and difficulties with multiple federal agencies, the protection of minority population groups, the clarification of the scope of services under state plans, the eligibility of practitioners under state plans, coöperation with representative groups, clarification of the implication of the construction of needed hospitals and the important question of payment for services furnished by non-governmental hospitals and other agencies.

The general conclusions of the committee are sufficiently brief and clear to warrant repeating at this point. They are as follows:

"S. 1620 has received wide support from large and representative organizations. Its objectives are noncontroversial. Our government is dedicated to promoting the welfare of the people and the protection and improvement of health and well-being. Making available to all of the people the great life saving services which modern medicine has to offer is an objective which every right thinking citizen supports.

"The committee is convinced that federal legislation along the general lines followed by S. 1620, based upon federal-state coöperative programs, is necessary to strengthen the health services of the nation and to make provision for the progressive and effective improvement of health conditions in all parts of the country and among all groups of people. The needs are large, and an adequate program to put knowledge and skill more effectively to work will involve considerable expenditures of funds. The program must therefore be worked out with great care. We are confident that such a program can be worked out and that the expenditures will be sound national investments which will bring large returns. The rôle of the federal government should be primarily to give technical and financial aid to the states.

"A critical analysis of the present provisions of S. 1620 shows a number of points at which its specific purposes can be more clearly stated and its provisions improved. The committee has not yet reached any conclusions concerning the precise rate at which federal appropriations should be increased, but the committee is agreed on the general principle that the proportion of federal assistance should be greater to those states in which there is the greatest need for the services contemplated under the bill. The committee is prepared to augment the provisions of the bill—if additional provisions are needed—to assure that the amount of federal assistance would in no instance be in excess of clearly demonstrated need.

"Some misunderstandings seem to have arisen, and criticisms have been expressed concerning parts of the bill. Some witnesses have assumed that it would bring about revolutionary or dangerous changes in medical care. We think these fears are unwarranted, but we will welcome further suggestions as to specific amendments which may safeguard the objectives of the bill. Medical science has reached a commendable status in this country. The bill should encourage the further evolutionary development of medical science, teaching, and practice."

ADDITIONAL STEPS FORWARD

In reviewing the present status of the National Health Program, it is surprising to discover the number and variety of steps which have been taken during the past year to extend and to facilitate public health and medical care practices by official and nonofficial agencies.

A number of the states have developed administrative procedures in the fields of public health, medical care, and hospitalization, particularly for the medically needy, which represent advances in a single year comparable with those made in several decades preceding. It is impracticable to record each of the areas in which these activities are rapidly moving forward, but they extend from the Atlantic to the Pacific coast. Many of them have no doubt been stimulated by discussions before the American Public Welfare Association, the American Public Health Association, the American Medical Association, the

American Hospital Association, and other groups interested in the subject.

The provisional drafts of material on "The Administration of Tax Supported Medical Care" informally discussed by the American Public Welfare Association, have given great impetus to the adoption of sound principles and practices throughout the country, particularly in the field of providing medical service for the indigent.

In those states where actual extensions and improvements in practice have not materialized, serious consideration is being given by public health, medical, and lay groups to the entire problem. In the State of Maryland, for example, during this past summer the Medical and Chirurgical Faculty has suggested to the State Planning Commission the creation of a continuing committee to concern itself with the problems of medical care and to formulate from time to time recommendations for better utilization and for extension of existing medical facilities, and for the institution of new facilities as they are required. The Faculty emphasizes its use of the term "Medical Care" in an inclusive sense to cover all the agencies available in safeguarding and improving the health of the people and in the treatment of disease.

The Faculty, in its proposal, recognized that "Although Maryland is fortunate . . . in her wealth of medical facilities and in the average high level of medical care which her citizens receive, yet this committee will quickly become aware of many urgent needs for improvement.

"Among the deficiencies in the present system of medical care in Maryland the following may be cited as outstanding examples:

"1. The lack of facilities for hospital care for Negro patients in the counties.

"2. The lack of adequate support for the out-patient departments of city and county hospitals.

"3. The lack of funds or organization for the medical care in their homes of those upon relief and for other classes of indigent patients.

"4. The lack of facilities for postgraduate education for practising physicians.

"5. The inadequate buildings, equipment, and budget of certain county hospitals.

"6. The lack of beds in the counties for the care of chronically disabled patients.

"7. The lack of adequate accommodations for existing institutions for the feebleminded, especially among the colored race.

"These urgent needs are cited merely as instances of some of the problems which demand solution."

The State Planning Commission of Maryland has agreed to the formation of such a committee on medical care, has recommended such a committee to the Governor, and steps are now under way toward its organization.

The method of approach used in Maryland is presented only as an example of the great interest which has been aroused in health as an element in social security. It is gratifying that in these efforts during the past year, the members of the medical profession have taken a leading and coöperative part, although the American Medical Association in its 22 objections to the Wagner Act still bases its militant contribution to the development of a sound national program upon the negative thesis of "all is well in the public health and medical field."

STOCK TAKING

Even this necessarily cursory review of the present situation in the public health field discloses that the national health program has advanced far and fast in the characteristically democratic experimental fashion with which we are familiar in this country. Innumerable approaches to the problem and to its solution have been developed at the various levels of government, with the earnest and helpful support of lay and professional groups. All of the undertakings, prospective, potential and actual, augur well for the future.

In March, 1939, your present speaker ventured a prophecy before the New York Tuberculosis and Health Association. Of the four elements implicit in that prophecy all have moved forward in an unexpectedly rapid though uneven formation during less than seven months.

That prophecy rested upon the concept, paraphrased aptly by Surgeon General Parran in his testimony before the Senate Committee on Education and Labor:

"In connection with balancing the budget, Mr. Chairman, I hope that this Congress will give more attention to balancing our health budget. It is cheaper to keep a woman from dying in childbirth than to take care of the orphans in an orphan asylum or to give aid to the dependent children. It is cheaper to aid in building tuberculosis sanatoriums than it is to pay for the death from tuberculosis and the widows and children who are left. The State Health Officer of Tennessee estimates that it costs on the average of $150 to bury a person in Tennessee, and on that basis it is costing that state more to bury people dying from tuberculosis than for its entire health program, including tuberculosis and all the other diseases."

The past year gives evidence of a number of adjustments of the American people to a changing environment, in which political, social, and economic forces, of historical and international scope, have been at play. It is not surprising that in these adjustments, public health and medical care problems, as important phenomena of this environment should come in for their share of discussion and experiment. People have long accepted the principle that in respect to public health no distinction should be made between the rich and the poor. Now they really want to put it into effect. Can we meet the challenge of economics, as we have always tried to meet the humanitarian one? The next ten years will give the answer. I, for one, feel it will be met!

The Physician's Part in Organized Medical Care*

HAVEN EMERSON, M.D., F.A.P.H.A.

Professor of Public Health Practice, DeLamar Institute of Public Health, College of Physicians and Surgeons, Columbia University, New York, N. Y.

IN a recent contribution to international relations among men of science, that wise and constructive university president, Dr. Isaiah Bowman, quotes some opinions of distinguished contemporaries, from among which the following two may serve a useful purpose here as introduction to the ideas I offer to this meeting:

"Sentiment and emotion have their places in the evolution of society from lower to higher, but in themselves are fallacious guides"; and again, "In these days of exaggeration, when mere political mechanisms tend to be worshipped as golden calves, the scientist at least knows that there is no collective salvation of souls and no final order. It is the business of science to discover truth, not salvation."

We of the A.P.H.A. are trying to apply our command of the facts of the sciences of preventive medicine for the benefit of our fellow beings, and some of us fear that ambition to achieve collective salvation has crowded science to one side. It would seem appropriate for our organization to look at the social programs urged upon the American public as tentative and hypothetical until they have been subjected to the scientific method.

Physicians generally recognize some maldistribution of the care of the sick and of public health service, mostly for reasons similar to those which determine other unevennesses in availability of the necessities for a good way of living. We know that quality of medical service as delivered does not always equal the best that can be had. We believe poverty and sickness are not recent emergencies, but chronic and perhaps permanent conditions of society worthy of every useful effort toward prevention and relief.

Three major factors affect unfavorably the distribution, quantity, and quality of medical care: (1) low earnings in terms of spendable cash income among unskilled wage earners and other persons of a low economic level of self-support; (2) unemployment of employable persons capable of self-support if there were a demand for their services; (3) lack of payment, in proportion to services rendered to the sick, by government, whether local, state, or federal, for free medical care of indigent persons contributed by the several medical professions, through individuals or organizations.

Extensive overcrowding of those particular medical institutions operated by government for mental and tuberculosis patients and for the feebleminded, and lack of full utilization of many general hospitals under voluntary auspices,

* Read at a General Session on Medical Care and the National Health Program, of the American Public Health Association, at the Sixty-eighth Annual Meeting in Pittsburgh, Pa., October 18, 1939.

constitute the chief dislocations or disproportions between needs and facilities for the sick by medical institutions.

Health departments of local and state jurisdictions with but rare exceptions fall far short of their potentialities to prevent disease and protect and promote health through the exercise of those common functions almost everywhere authorized by law, and long recognized as requiring specially qualified professional direction. Of the two major factors responsible for this unsatisfactory state of public practice of the sciences of preventive medicine, namely low per capita appropriation for health services and unqualified leadership and direction, the latter appears the more serious and the more readily remedied.

Of the several essentials of a life tolerable at the low level of the still self-supporting wage earner, and of persons even less fortunate, it would seem that medical care of sickness when needed and sought is more nearly sufficient in amount and character in this country than are any of the others. The discrepancy between need for, and supply of, medical care is less and its quality better in the United States than elsewhere.

We are concerned that persons be not denied medical care that they need and seek, for the only reason that they cannot at the moment command by cash payments such skills as their illness requires. Many experiments are under way to reduce such failure to meet the needs of the sick by ingenuity of thrift and medical adaptation. Among these are instances of success, whether measured by patients, physicians, or civil government.

By suitably phrased definitions one may readily and honestly come to the opinion that everyone lacks some medical service which might do him good. It is difficult indeed to discover anyone whose body and mind are so sound as to offer no opportunity for the benefits of medical advice.

There are defects and inadequacies of service for sickness and for health, some widespread, others sharply localized or regional, but none more serious than those corrected in the past, and by methods applicable now as then.

I venture to remind you of the Official Declaration of Attitude of the American Public Health Association on Desirable Standard Minimum Functions and Suitable Organization of Health Activities,* formally adopted at our meeting six years ago in Indianapolis. I think you will agree with me that there is nothing in this declaration, or I believe in any other made by our Association, which accepts responsibility for or charges us with the duty of including organized care of general sickness as a function of health departments, whatever their area of jurisdiction.

No new, unforeseen, or unfamiliar situation has arisen to threaten the health of our people, but rather a warning has been voiced that as a nation we are extravagant in the creation and destruction of human life as we are wasteful of the immense endowment of nature to which we became heirs more by accident than otherwise on this continent. Of all the factors dealt with by economists and sociologists, those of the health status and medical needs of the public are likely to remain for a long time the most precisely calculable and predictable.

The physician of the United States will probably continue to hold as desirable, voluntary, personal, economic, and professional relationship between doctor and patient, reliance upon administration of social policies consistent with our traditional form of representative government, confidence in the competence of the individual local tax-paying citizen to determine wise objects of tax

* *American Public Health Association Year Book, 1933–1934*, p. 6.

expenditure by local and state government, dependence upon a central federal health agency to supplement the services of local government as needed with technical and financial resources.

Even now after more than a half century of organized professional and governmental development of public health services, in but few respects and in but rare, fortunate, and scattered communities can the services of official health agencies in their own particular fields compare in quality and results with those commonly achieved in diagnosis and treatment of the sick in the voluntary and city or county general hospital, and by the independent self-supporting private practitioner of medicine.

Lest we waste thought and word, in discussion, unprofitable because of lack of primary definitions, let us accept common use of terms.

By organized care of the sick, let us mean the use of physicians and members of associated professions through institutions or agencies created by philanthropy, by government, by the medical professions, or by groups of other persons related through some common purpose, opportunity, or need.

A distinction between the care of the individual sick and public health services is that for the latter, effective use of much of our knowledge of preventive medicine calls for authority and some measure of compulsion. The major objectives of a health department are obtained in a large way by their effects upon groups, classes, or communities of people rather than upon individuals, and the burden of their provision is accepted as that of the tax-paying public.

As to personal care of the sick there cannot under our present laws and folk-ways be any compulsion except for the mentally irresponsible or in the management of certain conditions of communicable disease. The results of medical treatment of the individual depend largely and sometimes wholly on individual participation and desire by the patient for personal recovery, and the cost of this service has generally fallen upon the patient or his family, except in instances of poverty.

Preventive medical care has always been a part of the individual care of persons and families by physicians, while sickness is under treatment, in intervals between illnesses, and particularly during periods of development and growth such as maternity and childhood.

So much of our knowledge of preventive and curative medicine as can best be applied by the untrammelled voluntary paid relationship between the patient and the physician of his choice should be so carried on in the interest of the quality, quantity, and availability of service. So much of our control over preventable diseases as can only or best be done by public authority and tax resources should be carried on by government with the widest practicable participation by the individual practitioner of medicine.

The cost and intricacies of equipment and the skills required for good modern diagnosis and treatment of the sick have made the hospital indispensable as a shop for the individual practice of medicine, as well as for the humane care of the sick poor whose homes and resources do not permit suitable medical and nursing attention otherwise.

Public health services have been variously defined and it would be unwise for either a professional association of workers in this field, or government, or the community to be bound by any present form or phrase, or to refrain from change or expansion of services for any such formal reason as a definition contemporarily accepted.

What has seemed to me to be a sound and sufficient definition of public health service is the application of the sciences

of preventive medicine through government for social ends. While nonofficial health agencies are not part of government, they are responsible through their privilege of incorporation and tax exemption to government. Public health work as conceived under the definition offered is always the activity of an institution or agency of government serving social (that is, group or communal) rather than personal ends by the use of our knowledge of preventive, and, if you will, creative as well as protective medicine. Such a definition excludes from the field of public health, and I believe properly so, the extensive field of care of the sick. It seems to me to be likely to conduce to clarity of thought and precision of plan if we distinguish between organized care of the sick and public health, if for no other reason than that the specialized professional upbringing and experience of those in charge of services for the sick are in the main quite different from those of the officer of health.

Care of the sick includes much personal preventive service, which is certainly not given for a public purpose, although the end product is a better average health within the public body.

Organized medical care, then, with which we are dealing at the moment, includes care of the sick by institutions and agencies and the medical aspects of public health services.

There is an orderly and sound traditional relationship between physicians and the administration of institutions and agencies for the sick that has stood the test of time and has given solid satisfaction and results. This is best exemplified by the several functions and mutual relationships of the board of trustees and the medical board of the general voluntary hospital, the trustees holding the property, operating the institution through a paid administrative officer, appointing the medical board and holding it responsible for policies, methods, and results in the care of patients. The medical board and staff maintain standards of performance and professional discipline, and each member accepts personal individual responsibility for his diagnoses and treatment as he must for his services to patients elsewhere. It is under these conditions that physicians have contributed free services to non-paying patients of a money value in excess of the entire contribution of the public in taxes and donations for the hospital care of such free patients.

There is in fact only one field of organized care of the sick in which there is a widespread lack of good administration and professional direction, namely, home medical care of the indigent. Without attempting to enter upon this problem or the solutions of it undertaken here and abroad, let me refer you to the well considered reports and suggestions of the American Public Welfare Association, particularly its discussion of administrative organization and the conclusions and recommendations contained in its *Report on Medical Care* of June 1, 1938. The main and proper concern of physicians in this phase of organized medical care includes the quality of diagnostic and therapeutic skill provided, the administrative control of and the basis of payment for the professional services. The attitude of all responsible medical groups on this is the same though the methods of solution proposed vary in minor aspects.

Of all the multifarious problems involved in improving the present resources and methods for care of the sick by institutions and agencies, two have roused particular public concern, namely, the difficulty of the self-supporting wage earner or other employed person of small means in meeting the cost of medical service out of his individual savings or earnings, and the medical care of indigent persons.

Two methods have been developed with some success to facilitate thrift and coöperative resources of people of small means to meet some at least of the costs of their medical care, prepayment plans for hospital service, and cash indemnity insurance schemes to meet wage loss and medical costs of sickness. Neither of these methods is yet so well developed as to satisfy the principal objectives. Compulsory insurance schemes to meet the cost of sickness have been urged as necessary and practical. These have been generally, and always incorrectly, referred to as "health insurance" schemes. There is no such thing as "health insurance" in any honest, actuarial, financial, social, or medical sense of the words. The term "health insurance" is a charlatan's slogan used to catch political "suckers." There seem to me compelling reasons for us in this country to develop both of the former plans and oppose the latter.

There is general agreement that medical care of the indigent has never been and is not now satisfactory, on the grounds of availability, quality, methods of meeting the cost, or administrative responsibility.

It is distinctly a responsibility of the physicians of any community addressing itself to the problem of care of the indigent sick in a serious way to present its convictions on a few fundamental principles such as the following which have been widely accepted:

"Medical care is one of the necessities of life and therefore should be developed and operated with the advice of the organized medical professions (physicians, dentists, nurses and pharmacists);

"So far as possible, the opportunity to participate in the giving of this service should be open to all qualified practitioners rather than restricted to a few salaried professional employees;

"Free choice of the medical practitioner by the patient should prevail." (*Hospital Survey for New York*, Vol. II, p. 820.)

To these should be added the principle that continuity of individual medical responsibility and of record of the patient, the family and their illnesses is as indispensable for the dependent sick as for those able to command services for pay.

The essential features of an administrative system for the medical care of the indigent sick would seem to be the following:

"That medical care of the sick in their homes be included in the general program of the community for organized care of the sick, and be developed as an extension of hospital and outpatient service;

"That such care of the sick in their homes as is directly provided by governmental agencies be administered by a single governmental authority in each locality; and

"That the governmental agency to be responsible for this service be one which is primarily concerned with the care of the sick and under the immediate administrative direction of a full-time salaried physician." (*Hospital Survey for New York*, Vol. II, p. 821.)

We may find that the best official medical leadership for such organized care of the sick as is provided for out of tax funds, can be by extension of the functions of welfare departments to include this, by creation of a new department or bureau of local or state government exclusively devoted to care of the indigent sick, or by adding to the present functions of local and state health departments that of tax supported care of the sick.

In principle and for the sake of retaining the best we have achieved in public health service as a specialty of medicine, instead of diluting interest in and diverting attention from this by adding medical care, which the usual

health officer knows little about, to the functions he is now struggling to perform in a creditable manner, and not in all respects succeeding, I believe the usual health officer, whether state or local, should not be charged with the responsibility for care of the sick among the poor of the population.

It is obvious that only clinicians as individuals and as members of the staffs of medical institutions and agencies can be trusted with the diagnosis and treatment of the sick and with the preventive services to the individual patient. These must be drawn from the ranks of the practising medical profession, and those experienced in administration of institutions and agencies concerned with sickness.

What then shall physicians expect of the federal government and particularly of the U. S. Public Health Service?

Of first importance would appear to be good administrative organization at the top. The physicians of the United States whether concerned, as the great majority of them are, in personal medical care of individuals and families, or engaged in some institutions or agency of society or government, have a right to demand that the executive branch of federal government bring under a single leadership, department or bureau all federal civil functions requiring the application of the medical sciences by persons educationally qualified.

Neither the bonds that hold us together in the American Public Health Association nor the common interest of our very diverse professional and vocational elements are such as prepare us to assume any such leadership or activities as concern the care of the sick. I might go further and say that the people of the United States might well take alarm if they found that such an aggregation of persons, so unqualified by training and experience as we are in the care of the sick, should attempt to direct and execute a program of general medical care. The American Hospital Association, the American Colleges of Physicians and Surgeons, the American Medical Association, the American Dental Association, and the bodies of qualifying specialists representing the personal practice of medicine and dentistry, both preventive and curative, together with the American League for Nursing Education and the National Organization for Public Health Nursing, these are the responsible competent bodies to determine what can and must be done to better the care of the sick, but not, I believe, the American Public Health Association.

It seems to me that for the doubtful glamor of a brief emotional period of publicity we should find we had betrayed our trust, and sacrificed our distinctive position as a specialty group within the medical sciences, serving society through government for the prevention of disease and guardianship of health, if we should really do as some of our enthusiastic lay spokesmen have urged us to do, namely, take possession of the whole field of administrative medicine, care of the sick as well as public health.

It is the American Public Health Association that is at the crossroads. We must now decide whether we want to retain our professional distinction and special usefulness, or become a general utility agent for social theorists and legislative utopians who will not hesitate to work and praise us to achieve their dreams, regardless of the hazard to our future usefulness, and to our reputation as a body of competent specialists.

The physician's part in organized medical care is to be competent, and if possible expert in some special field of skill or experience.

Specialization is inherent in the elaboration of modern life and the biological sciences. It would be running contrary to experience for a specialty such as

public health to relinquish the field it has made its own for the sake of controlling others, in which its members are usually unqualified by any educational or experience criteria. If the American Public Health Association goes indiscriminate or philanthropic and tries to occupy the whole field of administrative medicine for the collective salvation of the nation, some other organization will have to be created for those physicians and colleagues of the present public health movement who wish to be associated in the application of science for prevention of disease, for the guardianship and creation of health, and for education in a biological way of living.

However much the talk of the inseparability of preventive and curative medicine, it is well to recall that in fact this desirable combination of services is effective only in the hands of the practising physician and his collaborator, the visiting nurse.

When we pass on to the level of organized, administrative services of institutions or agencies, logic and practice have distinctly separated the functions of public health from those of care of the sick, except so far as health departments demand control or offer supplementary care of persons suffering from communicable diseases, I believe this separation and specialization of functions of a medical nature to be desirable.

A central single federal health service organization with suitable personnel and resources might well undertake a survey of the national health resources, those of state and local jurisdictions. Sickness, its incidence, treatment, costs and economic implications whether of origin or neglect is not a measure of a nation's health, or of its use of authority or funds in protecting or developing health by the sciences of preventive medicine.

The U. S. Public Health Service could make no more constructive contribution to the cause of national health than to disclose to the public, by authoritative documentary evidence, the extent to which each state falls short of supplying indispensable services of known worth and cost to its population, and at the same time reveal the true causes of failure, waste, and loss of value of services due to the intervention of partisan political interests in the appointment of health officers and the conduct of the functions authorized by law.

If the Public Health Service would set for itself the task of applying the *Appraisal Form* of the American Public Health Association to the measurement of health services, as we, the independent professional body in this field, have defined and analyzed them, then indeed we might have a national health survey worthy of the name and commanding universal respect.

That would offer marching orders for city managers, common councils, boards of supervisors, mayors and governors to set their respective health houses in order and make a living reality of health services out of what is in many places a mere gesture. For our form of civil government to function, for our social forces to exercise their infinite potentialities for good, the occasion, the need, the opportunity, the origin of improvement, whether in schools, courts, fire protection, taxation, or in our chosen field of health service, must be real and local, understandable in simple language to simple people, and permit them in their usual circle of life and work to take action which will make their local government serve them better.

We need from the U. S. Public Health Service an objective, impersonal, nonpolitical, scientific statement upon the extent to which public money is now spent effectively or otherwise for health protection in each major health jurisdiction, the errors in methods, the advantage to be expected from altered ways, better trained personnel, and more adequate financial resources.

Upon such a survey each state, its legislators, executive officers and its informed citizens can build their plans for adequacy, and calculate the cost, and then determine whether their necessity is such that they can properly and honestly appeal to federal government for grants in aid to help them carry the burden of necessary local health functions.

We of the American Public Health Association and the professions and associated organizations of kindred purpose constitute the organized health conscience of the people of this country. If we allow ourselves to be swamped by assumption of functions for which we are but ill qualified, if at all, we shall sacrifice not only the distinction of our calling but public trust in our leadership.

I appeal to you to put your trust in the organization of other forces, in the medical profession in particular, to bring care of the sick up to the best performance that the state of medical science permits and the instincts of practical humanity and social ingenuity can devise, and decline to be diverted into that field, but instead to rededicate yourselves and our Association to the mission we have received from our predecessors, and make health protection and health creation our permanent and exclusive objective.

Industrial Hygiene for the Smaller Plant*

GLENN S. EVERTS, M.D.

Formerly Medical Secretary of the Philadelphia Health Council and Tuberculosis Committee, Philadelphia, Pa.

INDUSTRIAL hygiene—the prevention and control of occupational hazards—presents the same problems for the smaller plant as it does for the large one. The lead hazard in a foundry where only 10 men are working may be just as acute as in a lead plant employing 1,000 men. And the exposure to carbon monoxide in the garage of a small candy factory is just as real as the same exposure around several coke ovens. But if these and less serious hazards do not assume the same importance in the myriad of smaller plants that they do in the larger ones, it is only because the smaller plant suffers from the lack of someone trained to recognize them and institute measures for their prevention and control.

The smaller plant—and we arbitrarily think of the smaller plant as one employing less than 500 workers—is seriously handicapped in not being able to obtain adequate help in matters of industrial hygiene. Unless the smaller plant executive has been confronted with one of the major occupational hazards it is probable that the thought of seeking the services of an industrial hygienist, an industrial physician, or even a general practitioner, has never entered his mind.

It has been found that the majority of executives of smaller plants have a rather definite desire to help in maintaining the health of their workers, but a very vague idea about how they should do it. Few of them know where to turn to enlist the services of an industrial hygienist or an industrial physician. And not many of them have seriously considered the possibility of enlisting the part-time help of the more easily available general practitioner.

The figures for the number of smaller plants in the United States which enjoy any sort of systematic medical supervision seem not to be available. In Philadelphia, a survey made in 1923 showed it to be comparatively negligible. It is justifiable to assume, however, that because the smaller plants by themselves cannot afford the full-time service of an industrial physician, those which do have medical supervision are using the part-time services of a physician engaged in some form of private practice. With the most sincere respect for the general practitioner, it has been our experience that few of them become really interested in their industrial work beyond its remunerative aspects; they are certainly not interested in the problems of industrial hygiene except where there may be present one of the classical occupational hazards. The fault, of course, lies not with the physician, him-

* Read before the Industrial Hygiene Section of the American Public Health Association at the Sixty-eighth Annual Meeting in Pittsburgh, Pa., October 17, 1939.

self, but with those responsible for his undergraduate training.

We believe that nothing but good can come from an undergraduate course in industrial hygiene which includes a fair consideration of the practice of medicine in industry, as such, and which lays emphasis on the less serious but often more frequent occupational hazards. It is quite possible that postgraduate training in industrial hygiene will be made more easily available than undergraduate work. Definite efforts along this and similar lines are being made by the comparatively new Council on Industrial Health of the American Medical Association. At present, however, the fact still remains that the smaller plant, wherein two-thirds of the gainfully employed earn their living, find it difficult to make adequate arrangements properly to supervise the health of their workers.

For the past many years the literature on industrial hygiene has been filled with the studies and problems of inorganic dusts, carbon monoxide, and lead compounds. This seems to be perfectly natural because those compounds have been the most important as occupational hazards, but it has left the casual reader with the impression that the bulk of possible interest in industrial hygiene ends with those hazards. In the smaller plant work in Philadelphia we have felt it necessary to think of industrial hygiene in much broader terms.

Among 27 plants in which I helped to organize a medical service and served as the physician I found only one which harbored a classical hazard—a lead foundry. But I found a number of other hazards much less important, much less spectacular, but persistent enough for me to realize that they were truly the industrial hygiene problems of those particular plants, and some of these hazards were common to all of them. I refer to those frequently present hazards of extreme dry heat, heat with humidity, sudden variations in temperature, dampness, defective ventilation, defective illumination, and repeated motion. Although these hazards will probably not be found in any compensation schedule, very often they have been the direct or contributing factor in cases of lost time. And consideration of their prevention and control accounts for most of the time spent by the medical personnel on what justifiably can be called industrial hygiene.

Thinking of industrial hygiene in this broader sense, there are two reasons why these hazards of working conditions are seen with comparative frequency. First, in nearly all plants it is common to find processes which are either hot or wet or both, and rooms which must be maintained at subnormal temperatures. And second, those groups of employees entirely outside the departments of production are themselves subject to one or more of these hazards. They comprise a fair part of the plant population. They are the office workers and the maintenance group — power plant men, mechanics, electricians, carpenters, painters, and janitors; and the shippers, truck drivers, delivery men, and garage workers.

The following examples serve to illustrate a few of these frequent hazards and what we try to do about them. The men in the drying room of the tannery, working stripped to the waist during the hotter months of the year, obviously must be kept supplied with salt tablets, or, better yet, gum drops in which 10 grains of salt is dispersed. Likewise, salt must be kept available to the workers in the lard room and around the scrapple kettles in the packing plant. Almost continuous efforts to point out the wisdom of appropriate changes of clothing are made on behalf of the maintenance men going in and out of ice boxes on repair jobs. Wooden platforms are placed for the girls to stand

on while packing goods in refrigerated rooms and, again, the wearing of proper shoes, stockings, and other clothing is emphasized. Five minute ventilation periods twice a day are instituted in offices that are not air conditioned, and glass window louvres are installed. Girls packing crackers from moving belts are relieved frequently enough to prevent eyestrain. Workers developing tenosynovitis from repeated motion on unaccustomed jobs are changed to other work until they can safely attempt their original job again. And employees developing apparent idiosyncracies or allergic reactions to such substances as flour, sugar, and dust necessarily are removed from the offending exposure.

In view of the above more common, but nevertheless real, hazards of working conditions we believe it is justifiable to emphasize this fact—that it is not necessary to practise medicine in a plant where there are obvious toxic hazards in order to be exposed to a consideration of industrial hygiene.

The course of the foregoing remarks might lead one to believe that in our opinion toxic hazards are not frequently present in small plants. It does so happen that with the exception of a lead foundry we have learned of no serious results from whatever toxic hazards may be present in the production departments of the following industries: bakery, calf skin tannery, cigarette factory, confectioners, lithographers, men's suit factory, paper bag and paper box factory, pork packers, silk mill, woolen mill, or steel mill. But to say that no toxic hazards are to be encountered in these industries would be far from the truth. In tabulating the number of different hazards attributed to them, the *Bulletin of the United States Bureau of Labor Statistics*, No. 582, entitled "Occupation Hazards and Diagnostic Signs" was used as a guide. As two examples of the tabulation, it was learned that in a calf skin tannery one would probably find 23 toxic hazards, 2 possibilities of infection, one specifically anthrax of course, 9 agents which might cause a dermatosis, and 2 hazards relative to working conditions. And in a lithograph plant there should be found 29 poison hazards, 6 agents irritating to the skin, and 3 hazards of working conditions.

If any good can come from it we are willing to admit that our own list of the probable toxic hazards in these plants was less than half as large. Two explanations are suggested for this shortcoming: first, we have seen in the industrial hygiene literature very few cases reported, if any, of several of the compounds being hazardous as used in a tannery or lithograph plant; and second, within the past 10 years we do not recall an employee visiting the dispensary with symptoms suspicious of an exposure to any but a few of them. However, there is still no excuse for not being aware of the presence of every toxic substance in whatever plant we serve, who uses it, how often, and under what conditions. Certain minor clinical pictures in the individual employees exposed might thereby take on a new meaning, and we would have the satisfaction of being a better industrial physician for having recognized it.

Apparently the better way to be sure about the toxic hazards in a plant these days when so many new compounds such as the volatile solvents are being introduced is to go over a list of all substances used in the processes of manufacture with the plant chemist or some individual equally well informed. By checking this list with reliable information on the subject the ones commonly known to be hazardous can then be studied under their specific conditions of use. And probably more can be learned about the toxicity of the newer compounds by observing them suspiciously from a clinical viewpoint than by depending upon the technical

knowledge of their toxicity based upon admittedly unsatisfactory laboratory procedures. At any rate the industrial physician or general practitioner in industry should include the study of these compounds as a part of his regular work and be mindful of them in making his routine sanitary surveys.

The sanitary survey in the plant should be the means of keeping abreast of the entire picture of industrial hygiene. It can be as comprehensive as the physician in charge cares to make it. But, routinely, at least once every 6 weeks, the physician purposefully should take the time to go through the entire plant and even poke into the corners. In no other way can he retain a perspective of what is going on. Even when the survey has become his established habit it would be well to carry with him a work sheet upon which at one side are mimeographed the entire array of items of industrial hygiene and sanitation which he might encounter. These can be referred to at a glance and notes made accordingly.

In the smaller plant the physician has the advantage of a closer personal contact with the employees than he has in a larger one. Much can be learned by asking the foreman directly what problems of physical working conditions are unsatisfactory in his department—facts which the physician himself might not recognize for some time. If an appraisal of these facts substantiates the foreman's ideas the matter may be justifiably incorporated in the written report to the management. Furthermore, in a smaller plant the dispensary comes to be regarded as the employee's clearing house for complaints about most everything pertaining to working conditions. Some of these have real merit as industrial hygiene problems and are often supplemented by suggestions for their correction. The feeling generally seems to be that one suggestion from the doctor to the management will be taken more seriously than a dozen suggestions to the foreman who may frequently regard them as personal complaints or be hesitant about carrying them to his superiors. This accumulated information, then, can be added to the physician's survey notes and condensed into a short, readable report which if possible includes recommendations for their correction. Nine out of ten managements will appreciate this procedure and take steps to carry out the suggestions noted. It has been our experience that even though many minor corrections in a smaller plant may be made by the frequent possible interviews with the executives, the report of a survey in writing puts the more serious and expensive matters on record and lends enough additional weight to its contents to make the effort worth while.

In summarizing the above consideration of industrial hygiene in smaller plants, the following thoughts have been presented: (1) that the problems of the smaller plant may very well be as seriously hazardous as in the larger ones and should be treated accordingly; (2) that the lesser hazards involving working conditions assume a major rôle in most of the smaller plants but enjoy inconspicuous recognition in the industrial hygiene picture; (3) that the less toxic hazards are present in most plants in larger numbers than the average physician in industry realizes; (4) that the most satisfactory way to learn of the presence of those hazards is to comb the plant processes with the help of the chemist and to study the less well known ones from a clinical viewpoint until satisfactory laboratory procedures catch up with the pace; and (5) that adopting the procedure of a rather frequent plant survey and its written report is worth the effort as a means of keeping the management alive to the idea of maintaining better health for its employees.

But what we believe is the most important thought of all in this subject is neither the problem of the hazards encountered or how to handle them, nor is it the problem of the major work of caring for accidents and general health. What we do believe is of most importance is the fact earlier alluded to that such a large majority of smaller plants have no medical supervision by which an industrial hygiene problem might even be recognized. Finding some way by which the general practitioner who will take an interest in industrial hygiene can link arms with the small plant executive interested in the better health of his employees is the first problem of extending industrial hygiene into the field of smaller plants. It is a problem about which we have spoken a few times before. To solve it depends upon disseminating the knowledge of the feasibility of a part-time medical service which thereby implies a certain amount of publicity which in turn involves the question of medical ethics.

Recent considerations of the Council on Industrial Health seem very definitely to be paving the way for organized medicine to take some hand in the matter. We believe we are approaching the time when a larger number of small plants will be served by a larger number of general practitioners sincerely interested in industrial medicine and better trained in industrial hygiene.

A Study of Deaths from Farm Accidents in Alabama*

J. N. BAKER, M.D., F.A.P.H.A.

State Health Officer, Montgomery, Ala.

ALABAMA is predominantly a rural state, with approximately a 37 per cent Negro population. In 1930, 72 per cent of its population was classified as rural; 50 per cent, rural farm. The following study is based upon data secured through accident questionnaires† collected over 7 years (1932–1938) by the Bureau of Vital Statistics. Every certificate of death filed in the Bureau of Vital Statistics of the State Board of Health on which the medical certification gave an accidental cause of death was queried. The query was mailed to the family in which the accident occurred, a guarantee postage envelope being enclosed to make its return more certain. County health officers also have assisted materially in securing their completion.

For the purposes of this study, farm accident deaths have been divided into two groups: occupational and non-occupational. The former includes only deaths of persons gainfully employed in farming pursuits at the time of the accident; the latter, deaths of persons residing on farms, but not so employed when the accident occurred. Future references to these groups will be found under the terms "farm industrial" and "farm home."

The subject of farm accident fatalities has appeared only infrequently in the literature.[1, 2] Heretofore, emphasis has been placed largely upon the agency of injury. Broad descriptive terminology has blurred a detailed and specific picture of what happened and how it happened. The use of vague and non-descript terms such as "falls," "falling objects," etc., has given but part of the story. What is needed is more precise knowledge of how the accident actually occurred. Did someone slip on a particular object and how did that object get where it was? From a public health standpoint, a sufficiently complete picture of the accident must be had, in order to formulate sound guidance for its prevention. This is reflected in the recently developed "Heinrich Cause Code"[3] for the analysis of accidents. This code calls for the name of the agency of injury; name of agency's part; statement of unsafe condition, mechanical or physical; type of accident; statement of both the unsafe act resulting in the accident and the personal factor leading to the act. Were one to apply this Code to an accident, the data might be recorded somewhat as follows:

Agency: Saw
Agency's part: None
Unsafe mechanical or physical condition: Unguarded blade
Accident type: Pressed body against saw
Unsafe act: Using unguarded saw
Unsafe personal factor: Poor eyesight

* Chairman's address delivered before the Health Officers Section of the American Public Health Association at the Sixty-eighth Annual Meeting in Pittsburgh, Pa., October 19, 1939.

† Copies of the questionnaire are obtainable from the Alabama State Department of Health, Montgomery, Ala.

TABLE 1

Deaths from Farm Home and Farm Industrial Accidents According to Year, 1932–1938

Year	Home			Industrial		
	Total	Farm	Per cent Farm	Total	Farm	Per cent Farm
1932	...	...	....	168	44	26.2
1933	474	225	47.5	182	53	29.1
1934	595	292	49.1	209	47	22.5
1935	613	276	45.0	192	40	20.8
1936	645	284	44.0	236	47	19.9
1937	669	268	40.1	302	45	14.9
1938	652	249	38.2	196	33	16.8

Powers [4] made a contribution to the farm accident picture when he included the motivating activity as well as the agency of injury. However, he did not correlate the activity with the agency of injury.

In this study, effort has been made to apply such correlation. To add further to the accident picture, the 6 leading motivating activities have been listed in order of descending importance. Opposite each activity is shown the agency of injury, also in descending order of importance.

FARM INDUSTRIAL ACCIDENTS

General — Three hundred and nine deaths from farm industrial accidents (Table 1) were recorded over the 7 year period (1932–1938), an average of 44 per year. Of this number, 186 (60.2 per cent) were white; 123 (39.8 per cent) colored. Only 18 females were included; 8 white—10 colored.

An annual average of approximately 16 of each 100 deaths from farm accidents were classified as industrial.

The mean white death rate for the above period was 9.8 per 100,000—colored, 7.9. The corresponding rates for the white males and colored males were equal at 10.7.

Season — Forty-six per cent of the deaths occurred during the 4 summer months (Table 2 and Figure 1) (June–September), compared with half that figure over an equal period in the winter (October–January).

TABLE 2

Deaths from Farm and Farm Home Accidents According to Month of Occurrence of the Accident

Month	Farm Home						Farm Industrial					
	Total		White		Colored		Total		White		Colored	
	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent
January	178	11.4	103	11.0	75	12.1	20	6.5	15	8.1	5	4.1
February	154	9.9	86	9.1	68	11.0	27	8.7	18	9.7	9	7.3
March	157	10.1	100	10.6	57	9.2	19	6.2	11	5.9	8	6.5
April	138	8.8	75	8.0	63	10.2	19	6.2	11	5.9	8	6.5
May	95	6.1	65	6.9	30	4.8	29	9.4	19	10.2	10	8.1
June	72	4.6	51	5.4	21	3.4	47	15.2	25	13.4	22	17.9
July	96	6.2	61	6.5	35	5.6	31	10.0	16	8.6	15	12.2
August	125	8.0	86	9.1	39	6.3	29	9.4	17	9.1	12	9.8
September	105	6.7	66	7.0	39	6.3	36	11.6	21	11.3	15	12.2
October	116	7.4	66	7.0	50	8.1	17	5.5	10	5.4	7	5.7
November	144	9.2	84	8.9	60	9.7	21	6.8	13	7.0	8	6.5
December	180	11.5	98	10.4	82	13.2	14	4.5	10	5.4	4	3.2
Unknown	34		19		15							
Total	1,594	100.0	960	100.0	634	100.0	309	100.0	186	100.0	123	100.0

FIGURE 1—PER CENT DISTRIBUTION OF DEATHS FROM FARM HOME AND FARM INDUSTRIAL ACCIDENTS ACCORDING TO MONTH OF THE OCCURRENCE OF THE ACCIDENT

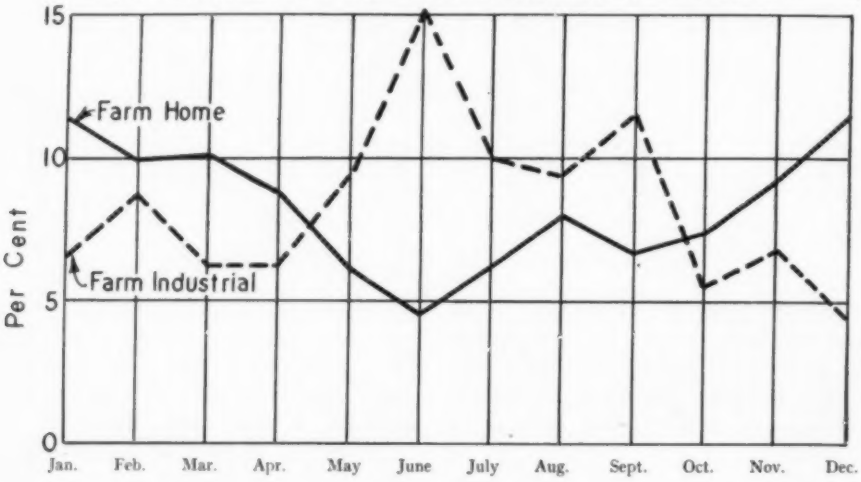

TABLE 3

Age Specific Death Rates per 100,000 Population from Farm Industrial Accidents, Males, 1932–1938

Age	*Male Population Engaged in Farming, 1930*	*Total Male Deaths*	*Mean Death Rate*
10–19	89,050	47	7.5
20–24	51,407	29	8.1
25–34	65,427	37	8.1
35–44	54,805	29	7.6
45–54	66,027	51	11.0
55–64	37,904	40	15.1
65–74	18,397	34	26.4
75 and Over	5,114	24	67.0
Unknown	185		
Total	388,316	291	10.7

Age—Ages of the decedents extend from childhood to old age (Table 3). Rates for males only are shown, because of the small number (18) of female deaths. The rates for males remained fairly constant up to 45 years, after which marked increases may be noted. Although the likelihood of males dying from farming pursuits at 55–64 years was double that at 10–19 years, it was less than one-fourth that at 75 years and over.

FIGURE 2—CUMULATIVE PER CENT OF DEATHS FROM FARM INDUSTRIAL AND FARM HOME ACCIDENTS ACCORDING TO INTERVAL BETWEEN DATE OF ACCIDENT AND DATE OF DEATH

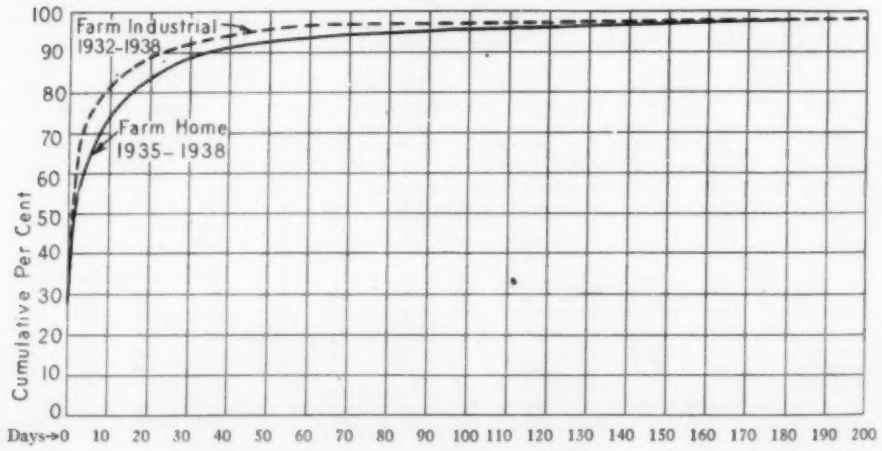

TABLE 4

Deaths from Farm Home and Farm Industrial Accidents According to Interval Between Date of Accident and Date of Death

	Farm Home			Farm Industrial		
Days	*Number*	*Per cent*	*Cumulative Per cent*	*Number*	*Per cent*	*Cumulative Per cent*
Instantly	281	26.4	26.4	95	31.8	31.8
Under 1 day	173	16.3	42.7	65	21.7	53.5
1 day	109	10.3	53.0	28	9.4	62.9
2 days	57	5.4	58.4	19	6.4	69.3
3 days	43	4.0	62.4	8	2.7	72.0
4 days	24	2.3	64.7	7	2.3	74.3
5 days	25	2.4	67.1	5	1.7	76.0
6 days	20	1.9	69.0	5	1.7	77.7
7 days	27	2.5	71.5	5	1.7	79.4
8 days	16	1.5	73.0	4	1.3	80.7
9 days	20	1.9	74.9	6	2.0	82.7
10- 19 days	94	8.8	83.7	15	5.1	87.8
20- 29 days	54	5.1	88.8	13	4.3	92.1
30- 39 days	27	2.5	91.3	6	2.1	94.2
40- 49 days	15	1.4	92.7	4	1.3	95.5
50- 59 days	12	1.1	93.8	4	1.3	96.8
60- 69 days	6	0.6	94.4	0	0.0	96.8
70- 79 days	7	0.6	95.0	0	0.0	96.8
80- 89 days	5	0.5	95.5	0	0.0	96.8
90- 99 days	5	0.5	96.0	1	0.3	97.1
100-199 days	28	2.6	98.6	4	1.3	98.4
200-299 days	8	0.7	99.3	4	1.3	99.7
300-399 days	4	0.4	99.7	0	0.0	99.7
400-499 days	2	0.2	99.9	0	0.0	99.7
500 days and over	1	0.1	100.0	1	0.3	100.0
Unknown	14			10		
Total	1,077	100.0		309	100.0	

Interval—Death follows a large per cent of farm industrial accidents quickly (Table 4 and Figure 2). About one-third of the deaths occurred instantly; one-half within 24 hours, and 78 per cent within one week. The interval between time of accident and death ranged from instant death to a maximum of 932 days.

Correlation—Applying the correlation technic previously referred to (Tables 5 and 6) it will be seen that of all

TABLE 5

Deaths from Farm Industrial Accidents According to Activity and Agency of Injury, 1932–1938

	Agency of Injury														
Activity	*Total*	*Animals*	*Falling Objects*	*Lightning*	*Sunstroke*	*Vehicles*	*Burns*	*Falls*	*Machinery*	*Poisons*	*Striking Objects*	*Hand Tools*	*Handling Objects*	*Other*	*Unknown*
Total	309	58	53	47	29	26	19	16	16	9	8	8	6	7	7
Cutting & Sawing Lumber	52	..	39	..	..	..	..	1	3	1	1	6	..	1	..
Caring for Animals	37	25	..	4	..	..	2	3	..	..	..	..	..	3	..
Plowing	31	6	..	10	8	3	..	1	..	..	1	..	2	..	..
Driving Vehicles	22	..	2	..	..	16	..	..	..	1	2	..	..	1	..
Clearing Land	17	..	3	..	..	..	13	..	..	..	..	..	1	..	..
Riding Animals	17	14	..	3	..	..	..	..	..	..	..	..	..	..	..
Building & Repairing Fences, etc.	12	..	2	..	..	..	1	6	..	1	..	..	2	..	..
Hoeing	10	..	..	6	3	..	..	..	..	1	..	..	..	..	..
Operating Machinery	10	..	..	..	..	2	..	..	8	..	..	..	..	..	..
Loading-Unloading Vehicles	10	..	2	2	1	4	..	..	..	1	..	..	..	..	..
Repairing Tools, etc.	6	1	..	..	..	..	1	..	3	..	..	1	..	..	..
Picking Cotton	5	..	..	1	2	..	..	..	..	2	..	..	..	..	..
Shucking Corn and Peanuts	3	..	..	3	..	..	..	..	..	..	..	..	..	..	..
Other	22	1	1	6	4	1	1	1	2	1	1	..	1	2	..
Unknown	55	11	4	12	11	..	1	4	..	1	3	1	..	..	7

TABLE 6

Per cent of Deaths from Farm Industrial Accidents According to Activity and Agency of Injury, 1932–1938

Motivating Activity	*Agency of Injury*					
	I	II	III	IV	V	VI
Cutting & Sawing Lumber 20.5	Falling Objects 75.0	Hand Tools 11.5	Machinery 5.8	Falls 1.9	Striking Objects 1.9	Poisons 1.9
Caring for Animals 14.6	Animals 66.7	Lightning 11.1	Falls 8.3	Burns 5.6		
Plowing 12.2	Lightning 32.2	Sunstroke 25.8	Animals 19.4	Vehicles 9.7	Handling Objects 6.4	Falls 3.2
Driving Vehicles 8.7	Vehicles 72.7	Falling Objects 9.1	Striking Objects 9.1	Poisons 4.6		
Clearing Land 6.7	Burns 76.5	Falling Objects 17.7	Handling Objects 5.9			
Riding Animals 6.7	Animals 82.4	Lightning 17.7				

known activities, cutting and sawing lumber was recorded once for every 5 farm industrial deaths. In 3 out of 4 deaths from this activity, a falling object was the destroying agent. Seventy-nine per cent of these objects were falling trees. Of the 8 remaining deaths, 6 were from falling limbs and 2 from being struck by a stick of wood.

Caring for animals—The activity second in importance, the caring for animals, resulted in 37 deaths, or 14.6 per cent of all the deaths from farm industrial accidents. Fourteen of these deaths involved mules and in 10 instances the animal kicked its victim to death. Other animals included 5 cows, 3 horses, 2 hogs, and 1 bull. Both of the accidents with hogs were caused by the decedent falling over the animal. One-half of those caring for animals were aged 60 years or over. This fact in itself would seem to indicate that unsafe acts may have been responsible for many such deaths.

Plowing—The activity third in importance, plowing (12.2 per cent), was associated with 31 deaths, 10 of which were from being struck by lightning. Eight were attributed to sunstroke and 6 involved animals. Of the latter, 3 were by kicking, 1 gored, 1 stepped upon, and 1 dragged. Two tractors overturned and the driver of the third fell under the plow. Two individuals were struck by the plow handles and one fell into an old well not known to exist.

Driving vehicles—The activity fourth in order of importance, driving vehicles (8.7 per cent), ended in death for 22 persons, three-fourths of whom fell—14 from wagons and 2 from trucks. Two were struck by falling objects—a falling tree and a shed. Two struck objects. One of the latter occurred by

hitting the head against a trestle as a wagon was driven under it; the other by striking the head against a log. One death occurred from snake bite. The driver had captured a rattlesnake and had tied it to a stick for transportation to his home. The snake got loose and he was bitten.

Clearing of land—The activity fifth in importance, clearing of land (6.7 per cent), resulted in 17 deaths, more than three-fourths of which were caused by burns. The burning of brush claimed 9 lives, and of stalks, 2. One individual fell into a pile of burning logs. One death resulted from burns received when a burning tree fell on its victim. In this activity group, falling objects claimed 3 lives and of these a falling limb and pole accounted for one each, while a dirt cave-in was responsible for the third. Pushing against a tree resulted in 1 death.

Riding animals—Of equal importance to the activity of clearnig land was that of riding animals, which also resulted in 17 deaths. Three of the decedents were struck by lightning. Of the remaining 14, 11 were caused by the rider becoming entangled in the harness and being dragged by mules. Interestingly enough, about one-half of the deaths from riding animals were of young people (10–14 years). Practically all of the decedents were under 25 years.

FARM HOME ACCIDENTS

Let us now turn from deaths from "farm industrial" accidents and consider those resulting from "farm home" accidents. The period here covered is one year shorter than that for the industrial study, being 6 years (1933–1938). The reason for the exclusion of 1932 is that in this year a severe storm of cyclonic proportions swept the state, causing an unusually high number of home deaths. To have included these would have given an inaccurate and distorted picture.

General—There were 1,594 lives sacrificed (Table 1) by accidents in farm homes, an annual average of 266 deaths. White deaths totalled 960 (60.2 per cent)—colored, 634 (39.8 per cent). Of the white figure, 512 (53.3 per cent) were females—448 (46.7 per cent), males. Again, of the colored figure, 325 (51.3 per cent) were females—309 (48.7 per cent), males.

The mean colored death rate (21.3 per 100,000) exceeded the white (19.0). The excess of the white female rate (20.9) over that of white males (17.3) was much greater than that of colored females (21.5) over colored males (21.0).

TABLE 7

Total Deaths from Farm Home Accidents and Mean Death Rates per 100,000 Population According to Age, Sex and Color, 1933–1938

	Total Deaths				*Mean Death Rates*			
	White		*Colored*		*White*		*Colored*	
Age	*Male*	*Female*	*Male*	*Female*	*Male*	*Female*	*Male*	*Female*
Total	448	512	309	325	17.3	20.9	21.0	21.5
0– 4	155	121	110	120	46.1	37.0	58.1	62.6
5– 9	40	49	40	39	11.2	14.2	18.6	18.6
10–14	26	23	29	16	7.5	7.1	13.8	7.9
15–19	19	9	15	22	5.9	3.1	7.9	11.5
20–24	19	11	17	8	8.4	5.2	14.2	5.7
25–29	14	4	9	9	9.1	2.5	11.4	9.2
30–34	10	13	10	7	7.9	9.6	18.8	9.6
35–44	17	12	6	13	7.1	4.7	6.0	8.0
45–54	16	8	18	13	6.8	4.0	10.1	10.0
55–64	14	27	14	20	10.1	24.2	15.9	32.0
65–74	37	53	15	26	47.3	85.4	35.9	78.9
75 & Over	80	182	25	32	255.0	613.0	142.6	166.2
Unknown	1		1					

TABLE 8

Deaths from Farm Home Accidents According to Activity and Agency of Injury, 1933–1938

Motivating Activity	Agency of Injury											
	Total	Burns	Falls	Firearms	Suffocations	Poisons	Lightning	Drowning	Cuts and Scratches	Animals	Other	Unknown
Total	1,594	527	419	148	138	122	55	35	19	13	104	14
Playing	229	115	38	21	5	4	4	13	3	8	18	..
Walking	185	5	161	9	..	..	4	1	1	1	3	..
Sleeping	159	48	1	3	89	2	..	..	..	..	16	..
Standing	134	72	26	10	..	..	15	3	3	2	3	..
Eating and Drinking	120	1	..	..	24	95	..	..	..	..	..	..
Sitting	76	35	19	9	..	..	10	..	..	..	3	..
Handling a Gun	51	..	..	51	..	..	..	..	..	..	..	..
Lying Down	37	12	14	1	5	1	1	..	..	..	3	..
Making a Fire	36	34	..	..	..	..	..	..	1	..	1	..
Cooking	15	10	5	..	..	..	..	..	..	..	..	..
Laundering	9	4	..	..	..	..	3	1	..	..	1	..
Other Housework	35	5	12	6	..	..	5	4	3	..	..	..
Getting in or Out of Bed	18	..	18	..	..	..	..	..	..	..	..	..
Taking Medicine	12	..	..	..	..	12	..	..	..	..	..	..
Climbing	11	..	7	4	..	..	..	..	..	..	..	..
Crawling	10	8	1	..	1	..	..	..	..	..	..	..
Dressing and Undressing	8	2	5	..	..	..	1	..	..	..	..	..
Carrying Inflammables	8	8	..	..	..	..	..	..	..	..	..	..
Carrying Other Objects	8	1	5	1	..	..	..	..	..	..	1	..
Bathing	5	1	2	..	..	..	1	1	..	..	..	..
Swimming	3	..	..	..	..	..	..	3	..	..	..	..
Smoking	3	3	..	..	..	..	..	..	..	..	..	..
Other	9	2	1	..	..	1	..	..	..	..	5	..
Unknown	413	161	104	33	14	7	11	9	8	2	50	14

Season—Only one-quarter of the fatal home accidents (Figure 1) occurred during the 4 summer months (June–September) compared with 46 per cent for the industrial group. Similarly, 40 per cent of the home accidents occurred during 4 winter months (October–January) compared with 23 per cent for the industrial.

Age—The death rates (Table 7) for both sexes were similar in each age group up to 50 years, after which the female rate became increasingly greater than the male rate with advance in age. Between 15 and 50 years, the rates remained practically constant. Colored rates exceeded the white in each age group up to 65–74 years, after which the opposite was true. The rates were similar for both sexes and colors up to 45–54 years, after which the white female rate rose to the highest point; white males, second highest; colored females, third; and colored males, fourth.

Interval—Cumulative per cents of deaths (Table 4 and Figure 2) according to interval from occurrence of accident to death, show, just as in the case of farm industrial accidents, that a large number of the decedents die shortly after the accident occurs. The rise in per cent is not quite so rapid as in the case of deaths from farm industrial accidents.

The motivating activity, as in the case of farm industrial accidents, has been correlated with the agency of injury (Table 8), as has also been the activity in order of descending importance with the agency of injury (Table 9).

Playing—Playing comprised 1 out of 5 of all activities ending in death, and burns constituted the destructive agency in more than half of the deaths (115) which occurred while playing. Forty of

TABLE 9

Per cent of Deaths from Farm Home Accidents According to Activity and Agency of Injury, 1933–1938

Motivating Activity	Agency of Injury					
	I	II	III	IV	V	VI
Playing 19.4	Burns and Burning Buildings 50.3	Falls 16.6	Firearms 9.2	Drowning 5.7	Animals 3.5	
Walking 15.7	Falls 87.0	Firearms 4.9	Burns and Burning Buildings 2.7	Struck by Lightning 2.2	Cuts and Scratches 0.5	Animals 0.5
Sleeping 13.5	Suffocation 56.0	Burns and Burning Buildings 30.2	Firearms 1.9	Poisons 1.3	Falls 0.6	
Standing 11.3	Burns and Burning Buildings 53.7	Falls 19.4	Struck by Lightning 11.2	Firearms 7.5	Cuts and Scratches 2.2	Drowning 2.2
Eating & Drinking 10.2	Poisons 79.2	Suffocation 20.0	Burns and Burning Buildings 0.8			
Sitting 6.4	Burns and Burning Buildings 46.0	Falls 25.0	Struck by Lightning 13.2	Firearms 11.8		

the 115 individuals injured in accidents classified under this rubric received burns from fires in open fireplaces of sufficient severity to cause death. Some fell into the fire and others were so close to it that their clothing became ignited. Thirty-one deaths in this group of burns (27.0 per cent) were caused by turning over vessels containing hot liquids. Practically all of the victims were less than 5 years.

In 10 instances matches set fire to clothing or other material. Clothes were ignited from yard and field fires in 14 instances. Falls, the second most important agency of injury in the playing group, resulted in a wide variety of accidents. More than half of the falls were from a higher to a lower level such as from porches or swings down to the ground. Of 21 gunshot deaths, 15 (71.4) were the result of someone playing other than the decedent, in 6, the decedent himself. Uncovered wells accounted for 6 deaths by drowning, while an equal number of individuals were kicked to death by animals. There were 5 suffocations, one of which was caused by a foreign body; one child was caught in the ropes of a swing, one fell between two planks, and one into a pile of cotton. There was one where the cause

of the suffocation was unknown. Of the 4 poisonings, 3 were caused by snake bite and one by a spider bite.

Playing as an activity was of approximately equal frequency per 100 accidents for both white and colored, although the per cent for males was higher than for females. However, the death rate per 100,000 population of those 5–14 years, in which age group practically all such deaths occurred, was for the white, 4.3—colored, 6.9. About 11 per cent of the white deaths in this group had their origin in burns received from fires in open fireplaces and of the colored, 29.8 per cent. For burns from hot liquids the percentages white and colored were 15.5 and 6.0, respectively.

Walking—There were 185 deaths from accidents which occurred while walking, making this activity the second most important (15.7 per cent). Falls were the most frequent agency of injury recorded (51.1 per cent) for this group. Falls from steps and falls on the floor were of about the same importance and accounted for 42 per cent in this group classified as walking. Porches were credited with 12 such deaths. Of the 9 deaths from firearms, 6 resulted from self-inflicted wounds. The act of walking is much more frequently associated with fatal injuries among white than colored, the motivating activity per cent distribution being 20.9 and 7.4, respectively. Comparison of the colored per cents shows them to be practically equal for both sexes, whereas the per cent for white females (25.3) is well above that of white males (16.3).

Sleeping—Sleeping, the third most important (13.5 per cent) activity, was associated with 159 accidental deaths. Over half (56.0 per cent) of them were from suffocation. Twenty-three infants were overlain. The agency of injury second in importance in this group was that of burns. Forty (83.3 per cent) such deaths were from burns received in burning buildings. While 35 per cent of the colored sleeping deaths were from burns, 25.6 per cent were recorded for the white. About 55 per cent of both colors in this activity group were suffocated. Proportionately more sleeping deaths occurred among colored (17.7) than white (10.8) and among males than females for both colors.

Standing — Standing, the activity fourth in importance (11.3 per cent), was associated with the death of 134 individuals, of which number 72 succumbed to burns. An open fire was the origin in 59 (81.8 per cent) instances. Falls, the second agency of injury in importance, accounted for 26 deaths (19.4 per cent). Falls from porches numbered 7. Others included falls on the floor, down steps, out the door, etc. Two persons were knocked down when a door was opened. Fifteen in the "standing group" were struck by lightning. Ten were shot, half the shots being self-inflicted, and 3 were drowned in wells.

Of the colored standing deaths, 52.6 per cent were caused by burns from open fires compared with 36.4 per cent for the white; 30.3 per cent of the white deaths in this group resulted from falls —colored, 5.3.

Eating and drinking—Eating and drinking, the activity fifth in importance (10.2 per cent), terminated fatally for 120 persons, of which number 95 were attributed to poisoning. Food poisonings totalled 45.

Of the 50 remaining deaths, 23 were from lye poisoning. Rat poison was charged with 4 deaths; kerosene, 3. Other poisons included bichloride, strychnine, calcium arsenate, gun powder, cotton and potato spray. Twenty-four of the eating deaths were from suffocation, 14 of which (58.3 per cent) were caused by foreign bodies.

Sitting—Sitting, the activity sixth in importance (6.4 per cent), was involved in 76 deaths, 35 (46 per cent) of which were from burns. Of the latter figure,

30 (85.7 per cent) were caused by open fires. Of the white deaths in this activity group, 32.6 per cent were caused by burns—colored, 63.6. Falls, the second leading agency of injury in the group, caused 19 (25.0 per cent) deaths. Five of the falls were from porches; 3, chairs; 2, swings, and 2 were on floors.

Taking medicine—Although the activity of taking medicine resulted in only 12 deaths, it is important to note the agency of injury. Nine of the decedents were white. A well known patent medicine for the relief of headaches taken in an overdose took one life. Still another patent medicine for the treatment of worms caused one death. In 2 instances oil of chenopodium was concerned. A combination of this oil and alcohol resulted in one of these deaths.

Living alone — While studying the data secured for this study, it was noted that a considerable number of fatalities occurred in homes where the decedent lived alone or was left alone at the time of the accident. Over the 6 year period 1933–1938, 44 such deaths were recorded. Of that number, 16 of the decedents were white—28, colored. In this connection, it should be remembered that whereas 37 per cent of the rural farm population was colored, 63.7 per cent of these deaths were of colored persons. Sixteen of the 44 were infants of 1 year or less. Thirty-two (72.7 per cent) were from burns, one-half of which were received in burning homes; the remaining half was almost evenly divided between falling into open fires and the clothing being ignited. Five infants crawled into open fires. Decedents from open grate burns covered the entire age range, unlike burns from other sources which were confined mostly to the early age groups.

CONSIDERATION OF AGENCY OF INJURY ALONE AMONG FARM HOME ACCIDENTS

Up to this point, discussion of the agency of injury has been confined to its linkage with the motivating activity. The discussion which follows will concern itself with the agency of injury without regard to the motivating activity.

Burns, including those from burning buildings, was the outstanding (Table 10) agency of injury, accounting for 33.4 per cent of all deaths, closely followed by falls (26.5 per cent). Firearms was third (9.4 per cent); suf-

TABLE 10

Number and Per Cent of Deaths from Farm Home Accidents According to Agency of Injury by Sex and Color, 1933–1938*

	Number							Per cent						
		White			Colored				White			Colored		
Agency of Injury	*Grand Total*	*Total*	*Male*	*Female*	*Total*	*Male*	*Female*	*Grand Total*	*Total*	*Male*	*Female*	*Total*	*Male*	*Female*
Total	1,594	960	448	512	634	309	325	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Burns	536	252	115	137	284	117	167	33.7	26.4	25.6	26.9	45.1	38.1	51.9
Falls	409	350	115	235	59	29	30	25.8	36.5	25.7	46.1	9.4	9.4	9.3
Firearms	154	76	54	22	78	48	30	9.7	7.9	12.1	4.3	12.4	15.6	9.3
Suffocations	138	73	49	24	65	31	34	8.7	7.6	10.9	4.7	10.3	10.1	10.6
Poisons	122	73	40	33	49	25	24	7.7	7.6	8.9	6.5	7.8	8.1	7.5
Drownings	41	20	10	10	21	10	11	2.6	2.1	2.2	2.0	3.3	3.3	3.4
Cuts and Scratches	18	10	5	5	8	2	6	1.1	1.0	1.1	1.0	1.3	0.7	1.8
Animals	10	7	7	..	3	3	..	0.7	0.7	1.6	...	0.5	1.0	...
Other	159	97	53	44	62	42	20	10.0	10.2	11.9	8.5	9.9	13.7	6.2
Unknown	7	2	..	2	5	2	3							

* Totals do not agree with those in Table 8 because the figures in this table were secured by machine count from punch cards, whereas, those in Table 8 were secured by hand tabulation. The differences, for the most part, are due to changes made in the classification of the agency of injury.

focation, fourth (8.7 per cent) and poisoning, fifth (7.7 per cent).

Color and sex—The per cent distributions by color were quite different. Among the white, burns accounted for 26.4 per cent—colored, 45.1. The per cent of deaths from falls among the white (36.5 per cent) was about 4 times the colored figure (9.4). Slightly more deaths occurred proportionately from suffocation and from firearms among the colored than the white. Among the white the per cent for both sexes from burns was about the same (26.0); the colored female figure (51.9) was well above that of colored males (38.1). On the other hand, the per cents for both sexes among the colored from falls were about the same (9.4), whereas the white female per cent (46.1) was considerably higher than that for the males (25.7).

Snakes—insects — Eight deaths resulted from snake bites. Of the 8 deaths from insects, 6 were caused by spider bites, 1 bee sting, and 1 unspecified. Among the industrial deaths previously discussed there were 9 deaths from snake bites making a grand total of 17 such deaths on Alabama farms.

Suffocation—Suffocation as an agency of injury destroyed 138 lives, all but 27 of whom (80.4 per cent) were under 1 year; 47 per cent of suffocations at all ages were colored. Forty-four infants (31.9 per cent) were overlain; 39 persons (28.3 per cent) were strangled by foreign bodies or food. More than half of the latter (22) were by foreign bodies; 38 (27.5 per cent) by bed clothes. Difference between white and colored per cents may be noted. Whereas 28.8 per cent of white suffocations were from being overlain, the per cent colored was 35.4. Proportionately 4 times as many white deaths involved foreign bodies (not food) as colored; almost 3 times as many colored deaths by food strangulation as white. Foreign bodies included such objects as follows: peanut, peanut hull, grain of corn, bone, bean, plum and watermelon seed, chewing gum, sweet potato, and a token.

Falls—Falls upon floors were practically equal to the number on porches and steps combined; two-thirds of all deaths from this agency occurred from falls in one of these three places. One in 10 fatalities resulted from falls from furniture. The per cent of falls on floors by Negroes (14.8) was considerably less than that for whites (35.4); the opposite was true of falls on porches and steps, although not to the same extent. Most of the victims from falls were over 65 years of age.

Burns—Over one-half (55.6 per cent) of all deaths from burns, not including those from burning buildings, were caused by open fires; the per cents white and colored were 43.2 and 67.6, respectively.

Firearms—Firearms were responsible for the sacrifice of 154 lives; 59 of which (45 per cent) were from playing with guns. In 47 such instances (79.7 per cent), the victim was not the person holding the gun. Most of those killed as a result of playing with guns were under 20 years of age.

Epilepsy on the farm—Epilepsy is also a factor which must be considered. Forty-one epileptics ended their lives accidentally. Twenty-nine (70.7 per cent) of the decedents were colored—21 (51.2 per cent) were females. The total age distribution was scattered from childhood (0–4 years), to old age (85–89 years). Twenty-six deaths (63.4 per cent) were from falling into open fires. Five deaths were caused by falls miscellaneous in character; 4 falls into wells or springs, and 2 from burns other than by falling into the fire.

LOCATION OF FARM ACCIDENTS

The per cent distribution of accidents according to location of place of occurrence around the farm home was quite

different from that of farm industrial deaths. The home was the site most frequently recorded (79.0 per cent). Second in importance was the yard (15.9 per cent), and third, the field (2.7 per cent). A combination of farm industrial and farm home deaths places the home first in importance (68.4); second, the yard (15.2 per cent); third, field and pasture (9.2 per cent); fourth, woods (2.8 per cent); and fifth, the barn (1.4 per cent).

HISTORICAL RECORD

During the 6 year period, 1933–1938, an average of 84 out of each 100 accident fatalities on farms were caused by farm home accidents and 16, farm industrial. Both types comprised a smaller proportion of all home and industrial deaths from accidents in 1938 than in 1933. The maximum number of farm home deaths (292) occurred in 1934, the least (225) in 1933 during the above 6 year period. Over the same period, farm industrial deaths reached their highest point (53) in 1933—their lowest (33) in 1938.

IMPORTANCE OF THE FARM ACCIDENT PROBLEM

During the 6 year period, 1933–1938, 44 of each 100 deaths from all home accidents, and 1 in 5 of all deaths from accidents in industry were caused by accidents which occurred on farms. Approximately 310 deaths can be attributed to farm accidents annually, a much greater number than to any of the acute contagions taken singly. Just as in the case of the communicable diseases, accidents are in no small measure preventable, and should be considered and treated as such in all public health programs. Accidents do not " just happen "; they are the result of a specific cause or group of causes. Our ability to determine those causes will mean the success or failure of any health program in this regard.

COLLECTION OF INFORMATION ON CAUSES OF DEATH FROM FARM ACCIDENTS

To date, all too little information of value exists regarding the detailed causes of death from farm accidents. In Alabama, 10 years of persistent and conscientious effort to collect such data has yielded much valuable information. However, in so far as farm accidents are concerned, we do not yet have the detailed information necessary for their prevention. After a careful study of the completion of several thousand questionnaires, the conclusion has been reached that a simpler form might bring better results than the conventional but elaborate one now in use. In most instances, classification of the accident had to be made from items of general information and the description of the accident.

It is highly essential that the questionnaire be completed by some competent individual as quickly as possible after the death occurs. With this thought in mind, the full-time county health officers, now existing in every county of our state, were supplied with questionnaire forms. They were requested to secure their completion, if possible, before the regular time for forwarding the certificates to the Bureau of Vital Statistics, and to enclose them with the certificates. The success of such a plan depends largely upon the coöperation which can be had from the health officers. Because of lack of full coöperation in several instances and the need to secure the information promptly, it became necessary to send questionnaires directly from the Bureau of Vital Statistics to the families concerned, when the forms failed to accompany the certificates in the monthly report received from the health officer. Such practice, it was found, frequently resulted in a more prompt and better completion of the forms.

In theory at least, it might be still better if a local registrar of vital sta-

tistics secured the completion of the form at the time the certificate of death was filed with him. However, such a plan in order to be successful would have to provide remuneration to the registrar.

Once the true causes of farm accidents are determined, then the county health officer and his personnel should, through education and widespread promulgation of rules for their prevention, be just as successful in their reduction as safety engineers have been in the reduction of accidents in industrial plants.

Information should be made available to all schools and to the farm group through 4-H clubs, county home demonstration and farm agents, by the newspaper, radio, and all other accepted means of public health education.

CONCLUSIONS

1. Accidents are an important cause of death on the farm and in the farm home.

2. A revision of our present accident questionnaire form seems definitely indicated.

3. More detailed information on the causes of accidents must be obtained.

4. Farm accidents, like all other accidents, should be viewed as preventable causes of death and every effort made to reduce them to a minimum.

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School Health Education*

WALTER H. BROWN, M.D., F.A.P.H.A.

Professor of Hygiene and Physical Education, Stanford University, Palo Alto, Calif.

IT is a privilege and a responsibility to present a summary and interpretation of the discussions of the School Health Section of a unique and unusually interesting Health Education Symposium. The credit for the scope, character, and content of these discussions is due to the careful planning and wise guidance of the discussion leaders, as well as, to the numerous participants who shared their experiences in moving a little closer to a more effective school health education program.

CONCEPT AND DEVELOPMENT OF SCHOOL HEALTH EDUCATION

If we are to attain the objectives of health education, we must see it as a continuous, integrated program at all age levels and view school health education as one important part of the larger problem of health education. Consideration is given here to those aspects of health education which occur in the schools under direction of the school authorities.

Our health education activities in the schools have developed from a number of different sources. The physician was called in to help control communicable diseases and remained to institute health examinations and lay the foundations for health service. The isolated teacher who included health instruction as a part of her program was compelled by pressure groups to teach hygiene and physiology for specific purposes. This developed into an acceptance of health as an educational objective and health instruction as one of its instruments. Then came the physical educator who thought in the early days he could exercise children into health—but the old activity program is moving toward a modern concept of physical education as contributor to a well rounded education for the whole child. And now we see guidance services of the school developing as a result of the problem child and the implications of the whole testing program. Unfortunately, these very important health activities have developed in most cases, as practically independent units of services. This lack of coordination has led to lowered levels of effectiveness and frequently to actual conflict. The result of this situation has led to many important and puzzling problems. It was the isolation of these problems, their analysis and discussion, that determined the objectives of this section of the Symposium. They may be stated as:

1. To bring to focus the problems and needs of the groups concerned with school health education.

* A Summary by the Chairman of the School Health Education Section of the Health Education Symposium, Western Branch, American Public Health Association, Oakland, Calif., July 23–28, 1939. The discussion leaders for the divisions of the Section were: (1) "Health Instruction in the Classroom," Dr. Edna W. Bailey, Professor of Education, University of California; (2) "Health Service in Schools," Charles E. Shepard, M. D., Professor of Hygiene and Physical Education, Stanford University; and (3) "Physical Education and Recreation," W. H. Orion, Director of Health and Physical Education, California State Board of Education.

2. To discuss ways and means of coöperative approach to the solution of problems.

OBJECTIVES AND COMPONENTS OF SCHOOL HEALTH EDUCATION

Two broad objectives should guide our plans and activities in school health:

1. To make it possible for every child to develop to his highest potential of health—physically, mentally, emotionally, and *socially*.
2. To provide in the curriculum for an understanding of and support for an adequate community health program as part of the education of every child.

In order to present the essential components of an adequate school health education program the problem may be considered under the following heads:

Health Instruction—The school administrator is responsible for all the areas of instruction in the curriculum, including health. As previously stated, the inclusion of health instruction in the school program came about largely through pressure groups. This development, however, led to the consideration by the educational leaders of the values of health to the individual—and their responsibility for proper attention to this area as a part of the curriculum. In the course of the reëxamination of the objectives of education, this resulted in health becoming one of the primary objectives of education.

While the translation of the facilities for making this objective attainable by the child has been slow and spotty, the discussion of the division on health instruction in the classroom indicated not only an acceptance of the objective but also an eagerness for aid in making this possible. Discussion of the basis for health instruction involves a consideration of three problems:

1. *Sound, scientific factual materials* are essential for the construction of an adequate inclusion of health instruction in the curriculum. While the teacher appeals to the medical and public health groups for assistance in providing, translating, and evaluating materials of instruction in all the fundamental areas bearing upon health, it is interesting that one of the requests of the public health groups is for a greater inclusion of just this type of material in the school health program.

2. *Scope of health instruction*—While the detailed scope of instruction could not be discussed, emphasis was given to the inclusion in health instruction of a consideration of the basic and contributory factors for healthful living. These might be classified under factors that:

   a. *Produce and Promote Health*—such as heredity, nutrition, excretion, exercise, rest, recreation, and adjustment to self and to the group.

   b. *Protect and Maintain Health*—such as control of communicable diseases including accidents, evaluation of health information and health advisers, protection of the special senses and community health services.

3. *Placement of health education materials* was found to be a technical matter in which the teacher is a better equipped individual than the medical or public health worker. We can function best by furnishing scientifically sound materials unless we have had training or experience in the field of education.

4. *Methods of Health Instruction*—The approach to health instruction was discussed from the standpoint of the older formalized subject matter method with direct teaching and the newer trend of a core curriculum with units of instruction.

Who is responsible for health instruction? What should be the relation of the health officer, school physician, nurse, dental hygienist, and other technical workers to classroom instruction? These technically trained workers can be effectively used to supplement and enrich the classroom instruction upon request of the teacher. But these workers should not replace the teacher in the classroom unless they are adequately trained in education. In general, the time of the public health nurse can be devoted to her field of individual health guidance and her activities that require technical preparation on a professional public health level.

Health Service in the Schools—The development of health service in the schools dates back to 1894 when Boston called the physician into the schools in

an effort to control communicable diseases. The evolution of the service from this single activity to the modern well planned program can be summarized in what have come to be generally accepted as the objectives and program of such a school service:

1. *Objectives*
   a. To control communicable diseases among school children.
   b. To discover and secure correction of handicaps where possible.
   c. To assist in providing and maintaining proper physical and psychological environment for the child.
   d. To provide technical advice and assistance for teachers.
2. *Program*
   a. *Health Examination* — In discussing the scope and frequency of the health examination, the value is seriously questioned when it is rapidly and superficially done, as is a common practice. Fewer and more thorough examinations are regarded as representing better practice than an annual inspection. Some believe that we should endeavor to shift the responsibility for the health examination to the parents through the family physician. There should be an evaluation of the items of the examination in terms of their diagnostic value and our ability to do anything about them.
   b. *Records*—The discussion of the character, purpose, and use of records elicited the trend toward a combined cumulative record. This led to a consideration of the problem of the legality and desirability of divulging certain information. There is general agreement that the result of the health examination should be made available to all teachers who need it through verbal or written interpretation by the examiner.
   c. *Follow-up service*—A well planned, adequately staffed follow-up service is essential if we are to secure a high level of benefit from the health services. The most important factor in the successful operation of this service is the public health nurse—who should have, in addition to her usual training in the fields of nursing and public health, a working knowledge and understanding of the principles of education.
   d. *Control of Communicable Diseases*—This is one of the primary responsibilities of the school health service through active coöperation with the health department where this department does not furnish the medical service.
   The plan of operation should include:
   (1) Daily health inspection by teachers and nurses
   (2) A system of exclusion and readmission of cases and contacts with communicable diseases—under medical supervision
   (3) Campaigns of immunization and tuberculin testing
   e. *Environmental Control*—It has become evident that it is desirable to make the supervision of the environment of the school the responsibility of a properly trained person. This should be assigned to the health service of the schools. It should include the control of the heating and ventilation, lighting, toilet and bathing facilities, the water supply—drinking, washing, and swimming—and the food supply.

In the school program these activities should be used essentially and basically as educational experiences rather than services.

PHYSICAL EDUCATION AS PART OF SCHOOL HEALTH EDUCATION

The representation of the physical education group in this Symposium and the discussion of the relationships of their activities to school health education were significant steps toward better coordination of all the factors in the school program bearing upon health. The basis for group discussion was the statement of policy for school board members and school administrators issued by the Society of State Directors of Physical and Health Education, entitled "The Public School Program in Health, Physical Education and Recreation." This policy recommends to school administrators all of the components of a well rounded school health program.

The objectives of a physical education program as viewed by this group are:

1. To protect and improve health.
2. To develop organic fitness and increase strength and neuromuscular control.
3. To develop desirable social attitudes and behavior.

4. To develop skills, habits, and attitudes in physical education activities which will contribute to wholesome, enjoyable leisure time pursuits.

This program was discussed in terms of the relationships to the other components of school health education. The work of this group of special workers should be considered an essential, fundamental part of the curriculum and not merely an activity grafted into the school program. Only by such an acceptance of these activities can the physical education program make its maximum contribution to the health of the child.

From the discussion, it also became clear that the group have a *desire* and a *need* for improved relationships with and services from the school medical service. Attention was given to the inadequacy or lack of health examinations and medical supervision — particularly in its relationship to athletics and the so-called "corrective" or adapted program of physical education. There are recognized opportunities and responsibilities for using these activities for personal and incidental health instruction.

It seems fair to conclude that if we are to develop the school health program to its maximum potential usefulness, the physical education group should be brought into closer working relationships, both in planning programs and in the conferences and meetings of our professional organization. The participation of this group in this Symposium is a step in the right direction. In a broader field the efforts on a national scale to coördinate the professional organizations should be commended and encouraged.

PROBLEMS AND NEEDS EMERGING FROM GROUP DISCUSSIONS

One of the significant by-products of the school health section was the emergence of the problems and unmet needs in this field. These could be very properly used as a basis for planning rather definitely the direction in which our future Western Branch activities should move.

To the writer, the most significant thing was the changed attitude of the special groups in seeing that their own activities are no longer self-sufficient, and the recognition of the need for help from the other groups. This attitude should be fostered and broadened to include the idea that we can *get* help of the other special groups but that we also have an equal responsibility to *give* them assistance in making their programs effective. Perhaps the most useful way to summarize these problems and needs is merely to state them briefly. There seems to be:

1. A need for an exploration, organization, and evaluation of the scientific materials that are required for sound health instruction.
2. A need for promoting a better mutual understanding of the plans, programs, and administration of the various components of a health education, official and voluntary, on federal, state and local levels.
3. A need to extend the areas of professional instruction of the health officer, dentist, public health nurse, and teacher to include a better working understanding of related fields.
4. A need for seeing more clearly the total health activities in schools in terms of the needs and interests of the child in relationship to the home and community.
5. A fundamental and dominant need for weaving all of these together, through better administrative relationships and more group planning, into a coördinated plan that will bring the highest potential benefits to the individual child and community.

The Differentiation and Identification of Bacillary Incitants of Dysentery*

MARION B. COLEMAN, F.A.P.H.A.

Division of Laboratories and Research, State Department of Health, Albany, N. Y.

EVEN a casual review of the current medical literature impresses one with the relatively high incidence of outbreaks of enteritis of varying degrees of severity, especially in institutions and camps, and, in fact, in any assemblage with a common food supply. Frequently the incitant is a recognized type of dysentery bacillus, but on the other hand the etiology often cannot be established. The purpose of this paper is to discuss (1) media for isolation, (2) criteria for identification of dysentery bacilli, (3) the study of hitherto unrecognized incitants of enteric disease, and (4) serologic tests with patients' sera as an aid in determining the incitant.

Experience in the Division of Laboratories and Research of the New York State Department of Health is in accord with that of Hardy and his associates [1] who have reported that desoxycholate-citrate agar [2] is of marked value in the isolation of dysentery bacilli. Since this medium is subject to some variation apparently dependent upon inconsistencies in the ingredients, careful standardization and adjustment are essential. Leifson [2] found certain peptones unsuitable; in our experience different brands and lots of agar have varied and adjustment of the sodium citrate content has sometimes been necessary. Beef and horse meat infusion may be fully as satisfactory as pork infusion in the agar base. These variations do not detract from the value of the medium but are important factors in its use.

Another consideration with reference to desoxycholate-citrate agar is that complete reliance cannot be placed upon it for isolation of all types of dysentery bacilli. The growth of a relatively small number of strains of the Flexner group and an appreciable number of strains of *B. dysenteriae* Sonne is restricted. The inhibitory action on available strains of the Shiga type indicates that it is not suitable for the isolation of this species, but no reports have been found in the literature to confirm this observation.

Thus, at least one additional plating medium less restrictive than desoxycholate-citrate must obviously be used. Hardy [1] has reported that desoxycholate agar without citrate is suitable for this purpose. MacConkey's medium [3] may also be satisfactory, and our experience at the Albany laboratory would permit recommendation of eosin-methylene-blue agar [4] and a satisfactory modification [5] of Endo's medium.[6] In any case, careful standardization with known strains of the species sought is highly important.

The second point to be discussed is the establishment of criteria for identification of recognized types of dysentery bacilli. Determination of the biochemi-

* Read at a Joint Session of the Laboratory and Epidemiology Sections of the American Public Health Association at the Sixty-eighth Annual Meeting in Pittsburgh, Pa., October 17, 1939.

cal as well as agglutinative properties is essential to identification of members of this group. Variations in the reactions of individual strains complicate their systematic bacteriologic study. The Shiga type, which is differentiated from the others primarily on clinical grounds, is apparently also distinct antigenically. Irregularities in fermentative properties have been observed, however, especially after cultivation on artificial media. *B. dysenteriae* Sonne and *B. dispar,* if the latter is to be considered a member of this group, differ from the others in that they ferment lactose, usually slowly. *B. dispar* produces indol, a property which has not been observed in the Sonne type. Since the latter changes readily from the smooth to the rough form, difficulties are encountered in securing satisfactory agglutinating serum and in identification by means of serologic tests.

A fourth type, designated as *B. dysenteriae* Schmitz, has incited a few extensive outbreaks of a comparatively mild form of dysentery in institutions in New York State.[7] This strain ferments maltose but not mannitol, produces indol, and is apparently antigenically distinct from the other types. *B. alkalescens,* although of questionable diagnostic significance, must be mentioned. Its recognition is relatively simple, since in addition to agglutination in known serum it ferments xylose, rhamnose, and dulcitol, and produces marked alkalinity in milk. There remain for consideration the Flexner group, those strains designated as B. para-Shiga (—) by Dudgeon and Urquhart[8] in 1919, and the so-called Newcastle type described by Clayton and Warren[9, 10] in 1928. Boyd,[11] who has made valuable contributions to the study of dysentery bacilli, has shown the Flexner group to be of complex antigenic structure and has stated that he believes the aerogenic Newcastle type to be a variant of this group.

In 1938, Hazen[12] reported the isolation of a microörganism, which in so far as could be determined, corresponded to that termed B. para-Shiga (—) by Dudgeon and Urquhart.[8] A strain of the latter could not be obtained for comparison however. It has recently been found that the strain isolated by Dr. Hazen is agglutinated in serum produced with the Newcastle type. This fact, together with information obtained from Dr. Hardy[13] that he had found Newcastle strains that failed to produce gas from dextrose and that fermented mannitol, has led to a study of such microörganisms. The preliminary findings indicate that a group of nonmotile Gram-negative bacilli, some of which produce gas in dextrose broth and may or may not ferment mannitol, are closely related serologically to the Newcastle type. The differentiation of these microorganisms is of academic interest, but seems of questionable import for purposes of diagnosis.

The third point to be considered is the study of new species. Isolated cases and extensive outbreaks of enteritis of undetermined etiology occur, and it may be assumed that either the methods in use are unfavorable for the isolation of the incitants or are inadequate for their differentiation from nonpathogenic species. Data regarding two species isolated in the Division of Laboratories and Research at Albany during the past few years may be of interest. Neither is considered a member of the dysentery group, but they are included here because they are apparently incitants of enteritis.

The first is a nonmotile Gram-negative bacillus that gives the reaction characteristic of the paratyphoid-enteritidis group in Russell's double-sugar medium.[14] Since it ferments lactose slowly and produces indol, it may be confused with members of the coliform group. It ferments maltose and mannitol but not xylose, rhamnose, or

dulcitol. This microörganism has been isolated from feces from 6 patients residing in widely separated communities, all of whom were said to have symptoms of enteritis. Agglutination was obtained in a 1: 320 dilution of the serum from one of these and not in sera from normal individuals. Blood was not received from the other patients. The 6 strains are agglutinated in serum from a rabbit immunized with one of them. No antigenic relation to any other incitant of enteritis has been demonstrated.

A report of the second species has been published.[15] This is thought to be closely related to either *B. lignieri* or *Pasteurella pseudotuberculosis*. It is a Gram-negative rod with bipolar staining that is motile when grown at room temperature but not at 37° C. It produces an acid reaction in the butt or in the butt and slant of Russell's double-sugar agar and usually there is evidence of gas in this medium only after 48 hours' incubation. It forms indol and ferments dextrose, maltose, mannitol, saccharose, and xylose, but not dulcitol or rhamnose. It forms acid slowly in medium containing lactose. Five strains have been studied and all are agglutinated in serum prepared with one of them. Three were isolated in other laboratories in New York State and sent to Albany for identification, two from lesions about the face [16] and one at autopsy from an ulcer in the intestines. The other two strains were isolated in our own laboratory from feces from children having enteric disease. This microörganism is pathogenic for small laboratory animals; mice are readily infected by feeding, which suggests a possible means of dissemination.

Since these unidentified species have been readily obtained from the selective plating media used for isolating bacilli inciting enteric disease, it is to be concluded that they would not be easily overlooked and that infections with them are probably rare.

The fourth point concerns the demonstration of serologic properties in patients' sera. One is at once confronted with the impracticability of performing routine agglutination tests with all types of dysentery bacilli. Another difficulty is presented by the frequent occurrence of agglutination with members of the Flexner group in sera from apparently normal individuals. Furthermore, agglutinative properties for the homologous strain may not be demonstrable with the methods at present available. This was clearly demonstrated in a recent extensive outbreak in a large institution incited by *B. dysenteriae* Schmitz. Blood from 26 patients collected within the first 12 days after onset failed to agglutinate either the homologous or the standard strain of *B. dysenteriae* Schmitz. Sera from 5 patients collected 1 month after onset were also tested and 4 failed to agglutinate these strains. Serum from the 5th individual agglutinated the homologous strain in a 1: 80 dilution, but gave no reaction with the standard strain of *B. dysenteriae* Schmitz.

In spite of these limitations, the agglutination test with patients' sera often plays an important part in determining the etiologic significance of unidentified species. It may well be that other serologic reactions such as precipitation or complement fixation may be found more sensitive and specific than agglutination and hence of greater diagnostic import.

SUMMARY

The incitants of bacillary dysentery comprise a group of Gram-negative bacilli having highly diversified characters. A study of biochemical and serologic properties is essential to their identification and a uniform system of classification should be established.

As methods of isolation and means of identification are elaborated, hitherto unidentified species will undoubtedly be

recognized as incitants of enteric disease. Thus the public health laboratory is faced with the problem of a systematic study of the various types of bacteria found in feces from undiagnosed cases.

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An Outbreak of Shiga Dysentery in Michigan, 1938*

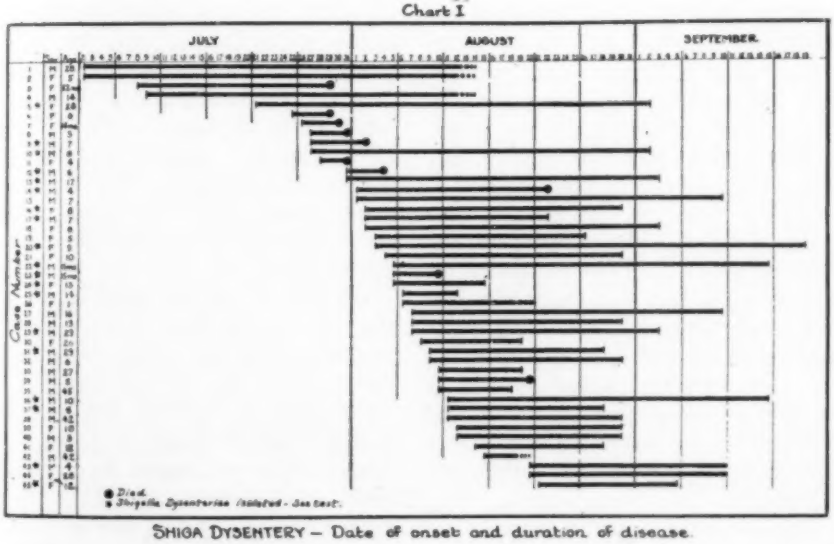
N. BERNETA BLOCK, M.D., AND WILLIAM FERGUSON

Field Physician, and Bacteriologist, State Department of Health, Lansing, Mich.

IN the summer of 1938 an outbreak of Shiga dysentery resulting in 45 known cases occurred in Owosso, Mich., and other parts of the state. The rarity of this disease in the northern states and the comparatively large number of persons involved are deemed important enough to warrant a description of the outbreak (Map I).

Attention was focused on the first cases in this outbreak when a physician was called on July 28, 1938, to visit 6 members of the "X" family living in one of the two tenant houses on a dairy farm 7 miles south of Owosso. The other tenant house was occupied by a middle aged man living alone who did most of the work in the dairy. He proved to be symptom free, and laboratory reports of fecal specimens were negative. The owner, "Y," lived in a third house on the farm.

Chart I

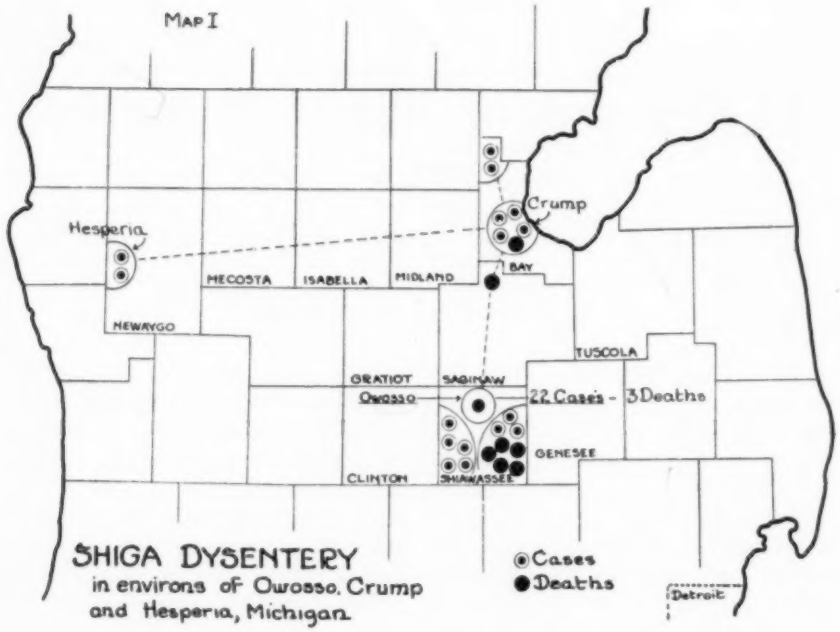


SHIGA DYSENTERY – Date of onset and duration of disease.

Of the 7 members of the "X" family, 6 had become suddenly ill with a violent bloody diarrhea. The mother (case 5)† was the first to succumb to

* Read at a Joint Session of the Laboratory and Epidemiology Sections of the American Public Health Association at the Sixty-eighth Annual Meeting in Pittsburgh, Pa., October 17, 1939.

† Case Numbers are listed according to dates of onset as on Chart I.



the distressing symptoms. Her date of onset (July 21) was followed in rapid succession by the dates of onset of her 5 children (cases 6, 7, 8, 9, 10). Because of prostrating toxic symptoms and the utter impossibility of caring for the family in their poverty stricken home, the doctor on his first visit ordered that they all be admitted immediately as emergency cases to the Owosso Memorial Hospital. The severity of the initial symptoms might be accounted for in part by the fact that the family had been on inadequate rations for some time and all showed signs of poor nutrition. The only person not affected at the time was the father (case 31) who subsequently contracted the disease in a mild form and remained ambulatory throughout.

The 4 year old daughter (case 11) of "Y," the owner of the dairy farm, had a history of diarrhea which began July 20. It became bloody in type on July 28, but because of religious scruples a physician was not called. The child died in the home on July 31, which was the date on which a 17 year old delivery boy (case 13), the first case to be reported in the city of Owosso, entered the hospital with a chief complaint of bloody diarrhea. He recalls that he delivered a catalogue to the home of "Y" on July 22, and loaned his pencil to the 10 year old son to sign for it. The 4 year old child, whose symptoms began 2 days previously, was absent from the premises at that time.

On July 29, the first child (case 6) in the "X" family died, after having been in the hospital but 1 day. On July 30, the second (case 7), on July 31, the third (case 8), and on August 2, the fourth (case 9) death occurred in the family. Also on August 2, an Owosso child of 6 years (case 12), suffering from a bloody diarrhea, was admitted to the hospital and died 2 days later.

The symptoms common to all these patients were: a sudden onset of violent, almost continuous diarrhea which immediately or very soon became bloody,

accompanied by nausea, vomiting, restlessness, irritability, and a moderate rise in temperature. Signs of dehydration appeared very early. Excruciating abdominal pain and tenesmus were present, and very often, especially in the younger children, a prolapse of the bowel or a constant hemorrhage from the rectum was noted.

DIAGNOSIS

A search for the causative agent was made in the fields of toxicology, protozoölogy, and bacteriology. Reports in the first two fields were negative. *Shigella dysenteriae* variety Shiga was isolated on August 5 from cultures of necropsy material from case 9 (the first time this organism had been isolated in the state laboratories).

The findings on case 9 are recorded in detail as a typical case, and the one on which the diagnosis of the outbreak was made.

Case 9. L. B., Age 4 Years

Date of onset—7-27-38. Date of death—8-2-38. *Chief complaint:* Violent bloody diarrhea. *Past History:* Generally under par for some months, otherwise not essential. *Family History:* Father was living and well; mother ill with the complaint of violent diarrhea; brothers, two, ill with the same complaint; sisters, three, two ill with the same complaint. (One sister who was living with the grandmother was well, and does not enter into the picture as she had not been living at home for some months and had not visited or been visited by members of the family.) *Physical Examination:* Head — no abnormalities noted except dryness of mucous membrane; Neck—no glands enlarged; Chest —Lungs—voice sounds and breath sounds normal, no rales. Heart—not enlarged, normal rhythm, no murmurs; Abdomen—scaphoid, no distention, no masses or organs palpated, diffuse tenderness. *Laboratory Work:* Blood Study: (7-28-38) Hemoglobin—85% (Sahli); White blood cells—27,000, 6% Lymphocytes, 2% Large Mononuclear cells, 22% Neutrophils, segmented, 60% Neutrophils, non-segmented, 10% Metamyelocytes.

Signs of dehydration were present on entrance to the hospital. The violent diarrhea continued, became almost constant, and the child's condition rapidly grew more serious. Shreds of mucus, pus, fresh and occult blood were discharged from the bowel. On the seventh day of the disease (8-2-38) the child died. A post-mortem examination was made 6 hours after death and necropsy specimens were sent to the Michigan Department of Health and the University of Michigan Pathology Department.

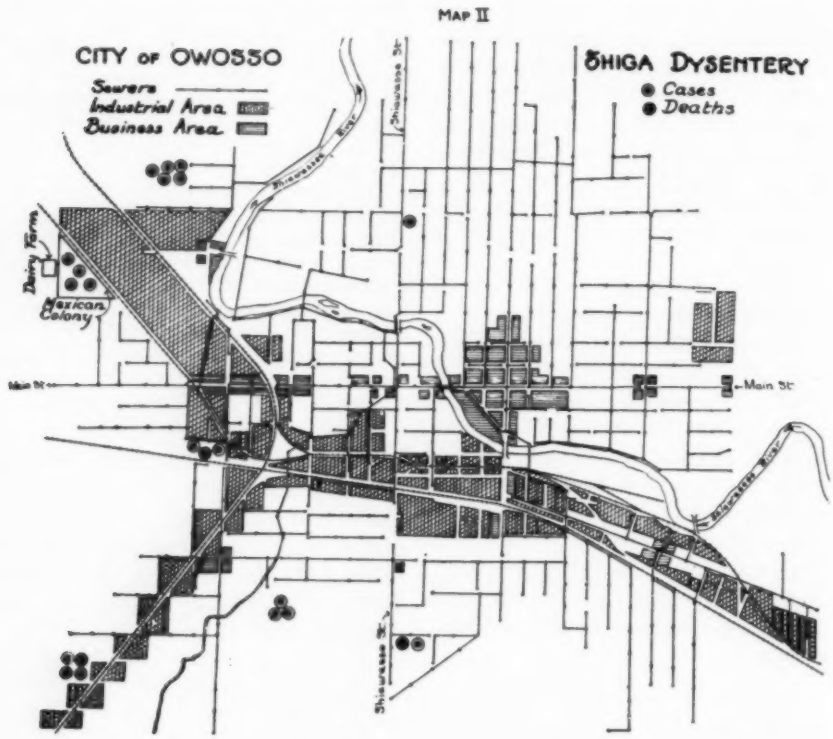
The *Autopsy Report* of the Colon reads as follows: "Extremely severe necrotizing ulcerative and hemorrhagic colitis. Practically no mucosa remaining. The hemorrhagic process extends to the muscle in practically all regions and in some areas involves the complete thickness of the circular muscle coat. The necrotic surface is covered with an almost continuous layer of bacteria."

BACTERIOLOGY

Washings from the small and large intestine were made and streaked on Endo, and MacConkey plates. Poured plates of bismuth sulphite were also made with the washings as inoculum. From the 30-odd plates that were streaked with dilutions of the intestinal contents only 2 non-lactose fermenting colonies proved to be *Shigella dysenteriae*, variety Shiga.

Identification of the organism was made on the basis of biochemical, serologic, and stain reactions. The reaction on triple sugar was typical of dystentery organisms—alkaline slant, pink butt, no gas, no H_2S produced. In single sugars dextrose and levulose were fermented; lactose, sucrose, maltose, mannite, xylose, dulcite, and inosite were unaffected. Indol was not formed after growth in tryptone water for 72 hours, and the organism was not motile after 4 hours' and 24 hours' growth in nutrient broth. Gelatin was not liquefied in 168 hours. The staining reaction was Gram-negative.

With two lots of specific Shiga antisera, one lot furnished by Parke, Davis & Co. and the other by Lederle & Co., the organism was agglutinated in a 1:1280 dilution of both sera. Flexner polyvalent antiserum failed to agglutinate the bacteria in the low dilution of 1:80.



Because of the failure of the central laboratory in Lansing to isolate anything of significance from shipped specimens, a field laboratory of the department was established in Owosso to plate specimens as soon as they were obtained. The routine procedure in this laboratory was to emulsify the fecal specimen in physiological saline, making a heavy suspension, and to inoculate a plate of bismuth sulphite. The material was further diluted and 2 plates of Endo medium, and 2 plates of MacConkey medium were streaked serially from this inoculum.

It was found that MacConkey medium was particularly valuable for isolation of Shiga organisms, since it was less inhibitory than the Endo medium employed and yet did not permit an overgrowth of lactose-fermenting bacteria. Practically without exception more colonies of Shigella were found on MacConkey medium than on Endo, and the colonies were larger in size. It was also easier to distinguish different types of non-lactose-fermenting colonies on MacConkey medium.

It has been the experience of many state laboratories that the recovery of *Shigella dysenteriae* from shipped specimens, with or without preservatives, is generally unsuccessful.* Our own experience in the early cases, and subsequent attempts at isolation, resulted in failure. At the field laboratory stools from known cases of Shiga dysentery were divided, part placed in the usual fecal container with 30 per cent glycerine solution as a preservative, and the other part cultured immediately. The preserved specimens were sent to the

* Confidential Communications.

Central Laboratory and cultured about 24 hours later. Out of 10 specimens from which *Shigella dysenteriae* was isolated from the fresh stool not a single isolation was made from the preserved portion. The stools were teeming with dysentery bacilli and with comparatively few coliform organisms.

The experiments with shipped specimens, while few in number, agree with the experiences of others and confirm their opinion that at present *Shigella dysenteriae*, especially the Shiga variety, must be isolated from fresh fecal specimens.

From our observation bacteriological examination of the fresh feces was necessary within an hour after passage for successful isolation of *Shigella dysenteriae*, although in a few instances the organism was isolated when the stool had been obtained 2 hours prior to plating.

On August 6, a Mexican boy, age 14 (case 25), from the Mexican colony in the northwest section of Owosso (see Map II) was admitted to the hospital and a diagnosis of Shiga dysentery was made after isolating the organism from fecal specimens.

Deaths continued to occur (see Chart I), and by August 6, more than 45 cases of diarrhea were reported. *Shigella dysenteriae* variety Shiga was isolated from fecal specimens obtained from ambulatory cases presenting only mild symptoms as well as from hospitalized cases with severe symptoms. A description of the more significant cases will be brought into the text. For the complete list of those involved see Chart I.

Case 35, who was living outside the city but working in the Owosso Hospital, was placed as an orderly in the isolation unit on July 28, when the 6 patients from the "X" family were admitted. He became ill with bloody diarrhea on August 10. Although the organism was not isolated in his case, his family of 5 had similar symptoms of varying degrees, and the organism was isolated from stool specimens of his two sons.

Also, on August 10, it was reported from Bay City, some 55 miles north of Owosso, that from one family, 4 children with a complaint of severe bloody diarrhea had been admitted to The General Hospital. The symptoms described were identical with those of the patients with Shiga dystentery, and within a few days, *Shigella dysenteriae* variety Shiga was isolated from fecal specimens of 2 of the children, one of whom died.

These children (cases 14, 15, 20, 37) lived on a farm near Crump, about 15 miles north of Bay City, 70 miles north of Owosso (see Map I). It was found that about 2 weeks before the onset (August 1) of these cases, "Z" (case 1) and his family had come from the Mexican colony in Owosso to work in the beet fields on a farm almost directly across from their home. He and his baby daughter (case 2) had had bloody diarrhea since early in July. On their way from Owosso to Crump they stopped over night in a camp which also sheltered a Mexican family in which there was a 22 months old baby (case 3) with pertussis. Within a few days that baby developed a bloody diarrhea and died. Some time after they arrived in Crump a frail Mexican baby (case 26) in the home where they made a short stay contracted a violent bloody diarrhea and recovered only after a prolonged illness. "Z" and his daughter and the 4 children (cases 14, 15, 20, 37) frequently met at a third farm, where they went regularly for the family supply of milk and water and were known to use a common drinking cup. The day before the investigation was made in this vicinity he and his family again had moved to an unknown destination.

Cases 28 and 42 (son and father respectively) who lived in the same

neighborhood frequented the farm on which the above 4 children lived, and were there for a threshers' dinner just prior to the onset of their illnesses. Within the next few days (August 7) the son was critically ill with a violent bloody diarrhea, became emaciated, and remained in bed for 5 weeks. Shortly after, his father presented similar symtoms, though less severe. No pathogenic organisms were isolated in either case, but the diagnosis of Shiga dysentery was made on clinical and epidemiological evidence.

The "Z" family was finally located near the end of August in temporary quarters at Hesperia on the far western side of the state and the authenticity of his itinerary confirmed. While they were being interviewed 2 cases of bloody diarrhea in a family, mother and son (cases 44 and 43 respectively), living on the next farm were reported, and *Shigella dysenteriae* variety Shiga was isolated from specimens of the 4 year old boy. The acute stage of the disease, as far as "Z's" family was concerned, had passed, and no organisms were isolated but they gave a history of having had one or more members in the family suffering from severe bloody diarrhea during July and the first 2 weeks of August. No deaths had occurred in his family, so he did not consider it seriously.

From August 10 to 25, reports of persons ill with diarrhea continued to come in, until a total of 159 cases were on file. During the last 5 days of the month only a few new cases were reported, and by September 1 most of the 32 hospital patients had been released. By September 6, the outbreak had practically subsided.

CLASSIFICATION OF CASES ACCORDING TO CLINICAL AND LABORATORY FINDINGS

Of the 159 cases of diarrhea reported during the outbreak, 90 had, as a chief complaint, bloody diarrhea.

Forty-five of the 90 cases were diagnosed as Shiga dystentery. This was confirmed in 19 instances by isolating *Shigella dysenteriae* variety Shiga from fecal specimens. The remaining 26 were diagnosed on clinical or epidemiological evidence, or both. These patients were either members of families in which Shiga dysentery was present or where contacts with cases of Shiga dystentery outside of the household were known.

Failure to recover the organisms from fecal specimens in the above 26 cases may be attributed, so far as one could determine, to the following factors and conditions:

1. Specimens shipped to the central laboratory proved to be valueless.
2. Many of the cases were past the stage in which the organism was present in the feces by the time a field laboratory had been established. In some instances the patients were transient laborers and not located until the acute stage had subsided.
3. Death of the patient ensued in some of the early cases before specimens could be obtained.
4. Laboratory technic may not as yet have reached the point where the organisms could be detected in all specimens.
5. A few cases, if any, may not have had Shiga dysentery.

If conditions were right for the spread of *Shiga dysenteriae,* it is quite possible that they were also right for the spread of the various types of *Shigella paradysenteriae.* The variety Hiss-Y was isolated in 5, and the variety Sonne was recovered in 23 instances. We then were probably not dealing with two or three simultaneous outbreaks but with one in which the cases were caused by either dysentery or paradysentery. No mixed cases were discovered. That is, there were no cases in which both dysentery and paradysentery organisms were isolated from the same fecal specimen, and no families in which both types were found.

The remaining 17 of the 90 patients who complained of bloody diarrhea showed negative laboratory findings and

had no known contact with any of the known cases. For that reason they were not diagnosed Shiga dysentery. However, the dates of onset ranged within the same time interval as those having Shiga dysentery, and many of them complained of symptoms which were equally severe. The clinical diagnosis in this group ranged from "colitis" to "bloody dysentery."

Of the 159 cases reported and studied, there still remain 69 unclassified cases of diarrhea in which patients complained of mild to severe symptoms and no bloody rectal discharge. No organisms of the bacillary group were isolated.

CASE INCIDENCE

There were 17 families in which Shiga dysentery was diagnosed; 88 persons definitely exposed. Forty-five cases of this type of dysentery resulted, an incidence of 51.1 per cent. The average age of those who contracted the disease was 13 years and 3 months.

FATALITY RATE

Among the 45 cases of Shiga dysentery there were 10 deaths, a fatality rate of 22.2 per cent. The average age of those who died was 3 years and 11 months, all under the age of 8 years.

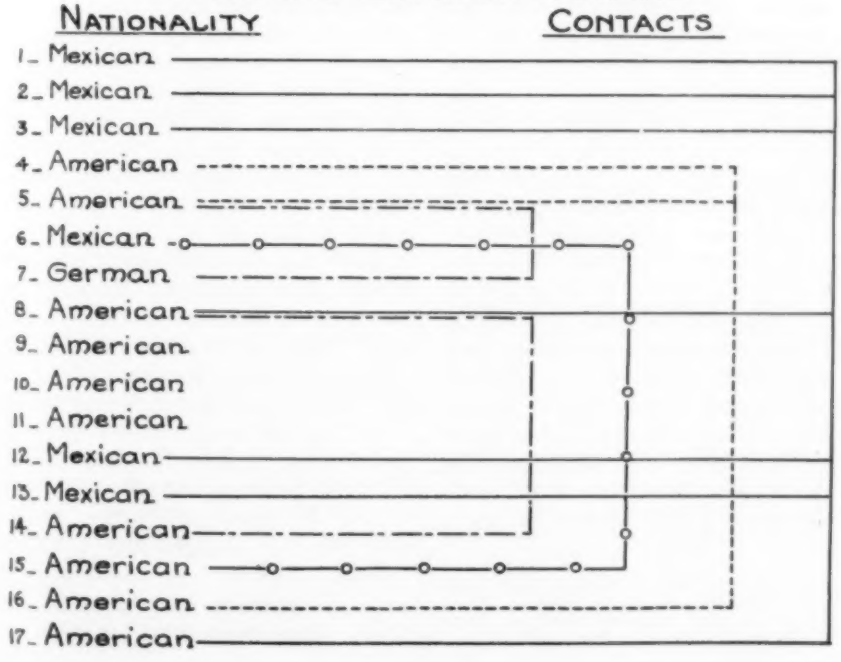
ENVIRONMENTAL FACTORS

Family Contacts — Contacts with known cases could not be established in all instances; those known to have occurred are shown in Chart II.

Housing Conditions—With very few exceptions, the persons who contracted Shiga dysentery came from underprivileged homes—45.4 per cent of the families lived in rural areas; 54.6 per cent lived in the City of Owosso. Approximately 93 per cent came from homes in which the situation with

Chart II

CONTACTS BETWEEN FAMILIES



regard to cleanliness, sanitation, and housing conditions may be rated as poor or exceedingly poor—obviously below the general level of the rural district or community in which they lived. The food served in the homes did not, in many instances, meet the requirements for good nutrition, hence one may also say that most of the persons exposed to the disease, especially the children, were physically under par.

Common Meeting Places—There was found to be no common grocery store or meat market, though many patronized a common chain store. There was no common drug store, bathing beach or pool, and no common church connection. There was a carnival in the outskirts of Owosso where food was served, but only a small percentage attended (7 per cent).

Milk Supply—There was no common milk supply, though it may be of significance that a small dairy located at the edge of the city and across the street from the Mexican settlement (see Map II) was patronized by several families in which Shiga dysentery was diagnosed. The milk was not pasteurized, and was sold in large quantities. Among those going regularly for milk were several Mexican families including cases 4 and 25; a family in which a child (case 34) died from bacillary dysentery 10 days after leaving Owosso to visit a relative in another state *; a family in which a 6 year old child (case 12) died of Shiga dysentery in the Owosso Hospital, and a family in which 2 members suffered from severe bloody diarrhea caused by *Shigella paradysenteriae* variety Sonne. Among members of the family on the dairy farm there were no complaints that would suggest dysentery. Stool specimens submitted were negative for organisms of the typhoid-dysentery group. The general sanitation about the farm was exceedingly poor. There was a common drinking cup at the well and several patients remembered having used it. The well water was reported "not dangerously contaminated."

Sanitary Conditions in the Parts of Owosso Where There Was an Incidence of Shiga Dysentery—The cases involved in the outbreak in the City of Owosso lived west of the center of the city (see Map II). In the northwest and southwest sections there are industrial areas as well as poorer residential quarters. In the northwest section is located a settlement for transient Mexican laborers where about 100 men, women, and children lived. This settlement served as temporary headquarters from which the laborers and often whole families went to various parts of the state to work in beet fields and vegetable gardens.

Conditions in and about the settlement were extremely poor. The 14 houses located within an area representing about one-half a city block were in disrepair, inadequately screened, and unclean. There were no sewer connections and no sanitary toilet provisions. One community hydrant carrying city water served as the water supply. With one or two exceptions, the personal hygiene was in keeping with the environment.

There had been repeated reports of bloody diarrhea among these people which dated back to the early part of July. When case 25 entered the hospital on August 6 his history showed that he had had as a playmate a former patient (case 4), who was admitted July 10, and discharged from the hospital July 17, a short time prior to the admittance of the "X" family (July 28). At that time no one thought the complaint "bloody diarrhea" of undue concern, and a diagnosis of "severe colitis" was made. Since case 4 could not be located

* Laboratory work done in Lafayette, Ind., Home Hospital. Laboratory Diagnosis: Bacillary dysentery, type unknown. Diagnosis based on clinical and epidemiological evidence, Shiga dysentery.

after the outbreak began, his history was obtained from case 25 and it was found that he had lived in the same house with "Z" (case 1) and had helped care for his small daughter (case 2). Clinical and epidemiological evidence seemed strong enough to include him in the series.

Since *Shigella dysenteriae* variety Shiga had been isolated from fecal specimens of one patient (case 25) in the Mexican colony and since there was clinical and epidemiological evidence against 3 others, specimens were requested from all persons on the premises. *Shigella paradysenteriae* variety Hiss-Y was recovered in 1 case. It was difficult to obtain coöperation, and those submitting specimens denied having had an acute bloody diarrhea. The authenticity of the specimens was questioned since it was felt that many were interchanged.

Water Supply—The water supply for the City of Owosso met the approval of the State Department of Health and no indication could be found that there had been a temporary lapse in the quality of the water. Many living outside the city limits and several within the city limits who contracted dysentery used water from private wells. Several of these wells were found to be "dangerously contaminated."

Sewage Disposal—The Bureau of Engineering of the Michigan Department of Health reported: "The sewage plant does not provide sufficient treatment for the city liquid waste during the summer months when the local cannery is in operation."

Sewer connections are not available in all parts of the city, especially in the northwest and southwest sections, the same parts of the city in which infection was most prevalent (see Map II).

The Bureau of Engineering also found: "Stream surveys have shown an increasing bacterial count through the city. This is probably due to separate sewer connections directly to the river or inadequate maintenance of storm water overflows on the intercepting sewer."

COST OF THE OUTBREAK

Twenty-four cases of Shiga dysentery and 8 cases of other types of dysentery (see Table 1) were hospitalized.

The actual expenditure of Shiawassee and Bay Counties for medical care and hospital maintenance of the patients afflicted was $6,351.54 plus $150.00 for burial expenses. All hospitalized patients were indigent.

A report given to the Shiawassee County Supervisors by a local business man shortly after the outbreak stated, "A tentative estimate of financial loss to business men and farmers of the community is placed at $40,000."

SUMMARY

1. An outbreak of Shiga dysentery resulting in 45 known cases occurred in Michigan in the summer of 1938. From fecal specimens of 19 cases the organism known as *Shigella dysenteriae* variety Shiga was isolated. In 26 cases the diagnosis of Shiga dysentery was made on a clinical or epidemiological basis since the patients were either members of the same family or had had contact with bacteriologically diagnosed cases. *Shigella para-*

TABLE 1

Type of Dysentery Organism Isolated	*Hospital*	*No. of Patients*	*Patient Days*	*Days per Patient*	*Maintenance Cost*	
					Total	*Per Patient*
Var. Shiga	Owosso	20	360	18.0	$3,096.07	$154.80
	Bay City	4	376	94.0	2,533.87	633.47
	Both Hosp.	24	736	30.7	5,629.94	234.58
Var. Sonne Var. Hiss-Y	Owosso	8	84	10.5	721.60	90.20
Total	Both Hosp.	32	820	25.6	$6,351.54	$198.48

dysenteriae variety Sonne was isolated in 23 cases and *Shigella paradysenteriae* variety Hiss-Y in 5. One hundred and fifty-nine cases of diarrhea comprised the total number reported and studied. Ninety gave as a chief complaint "bloody diarrhea."

2. Of the homes investigated 93.2 per cent were classified as "poor" or "exceedingly poor." All hospitalized patients were indigent. Of the families involved, 54.6 per cent lived in the city of Owosso; 45.4 per cent lived in rural districts. In 3 instances rural cases in geographically widely separated areas followed in the wake of a transient laborer against whom epidemiological evidence was so strong as to warrant the diagnosis of Shiga dysentery.

3. There is no clear evidence that the disease was spread by food or water, but there is evidence, not at all striking, that a few of the cases may have been milk-borne.

4. Direct contact was established in several instances as the outbreak progressed, but the "X" family on whom the diagnosis of Shiga dysentery was first made gave no history of contact with known cases prior to their dates of onset.

5. The disease was of a virulent type, causing 10 deaths among 45 patients, a fatality rate of 22.2 per cent. The average age of those who died was 3 years and 11 months.

6. Bacteriological confirmation of the clinical diagnosis was obtained only when the inoculation on culture media was made within a very short time after the fecal specimens were passed, 1 hour being approximately the time limit to insure good results.

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HEALTH is much more than the freedom or recovery from disease. It is a way of life, a balance, a compromise sometimes, worth sacrificing other desires or ambitions to achieve, and the most precious possession a person may lose or feel compelled to give up in exchange for other ambitions.—HAVEN EMERSON—*Pub. Health Rev.*, Univ. of Michigan, 9, 3 (Dec. 15), 1939.

Studies of the Acute Diarrheal Diseases*†

III. Infections due to the "Newcastle Dysentery Bacillus"

A. V. HARDY, M.D., Dr.P.H.; JAMES WATT, M.D., Dr.P.H.; MAXWELL H. KOLODNY, Ph.D.; AND THELMA De CAPITO

Consultant, U. S. Public Health Service, Washington, D. C., and Assistant Professor of Epidemiology, DeLamar Institute of Public Health, Columbia University, New York, N. Y.; Assistant Surgeon, U. S. Public Health Service, Albany, Ga.; Consultant in Bacteriology, Indian Medical Service, Albuquerque, N. M., and Research Associate, DeLamar Institute of Public Health, Columbia University, New York, N. Y.; and Junior Bacteriologist, U. S. Public Health Service, Albany, Ga.

THE variety of the "dysentery bacillus" discussed in this paper was first isolated by Clayton and Warren [1] of Newcastle, England, in 1925, and was subsequently designated the "Newcastle dysentery bacillus" by these workers.[2] They first obtained it from the feces of a girl who was suffering from diarrhea. Her entire family had been similarly affected within a period of 6 weeks. Her stools were watery and contained mucus, many pus cells, some red blood and epithelial cells. Many non-lactose fermenting colonies were found on the plates inoculated with the fecal material, but subsequent study of transfers from these colonies showed that the organisms did not conform to any previously described strains of Shigella or Salmonella. Three years later the same workers obtained similar organisms from a small epidemic of diarrhea in a children's home and from a second family outbreak in which there were two rapidly fatal infections in a boy of 5 and a girl of 8 years. Soon thereafter 3 hospitalized cases, 1 fatal and 2 with relatively mild but recurring disorders, yielded organisms with the same distinctive cultural and bacteriological characteristics. The clinical notes and bacteriological findings concerning these cases were published in two communications (1928 and 1929) with the conclusion that "the evidence suggests that these organisms may be responsible for the disease condition."

An entirely independent study of dysentery in India led to the identification of a similar variety of organism. Boyd [3] has reported the classification of over 7,000 isolations of Shigella. The well known varieties accounted for 80.9

* From the National Institute of Health, Division of Infectious Diseases, Dr. R. E. Dyer, Chief; with the cooperation of the DeLamar Institute of Public Health, Columbia University, New York, N. Y., and the following health departments or agencies: New Mexico State and Bernalillo County; Georgia State and Dougherty County; New York City (Divisions of Preventable Diseases and Laboratories); New York State, through the District Office at Middletown; and the Indian Medical Service.

† Read at a Joint Session of the Laboratory and Epidemiology Sections of the American Public Health Association at the Sixty-eighth Annual Meeting in Pittsburgh, Pa., October 17, 1939.

per cent of all; Flexner 50.2 per cent, Shiga 14.3 per cent, Sonne 10.9 per cent, and Schmitz 5.5 per cent. The remaining organisms were separated into serological groups, and examined in detail with regard to cultural characteristics and probable pathogenicity. The largest group, known by the number of the type-strain, 88, accounted for 5 per cent of all isolations. These organisms were described in detail in 1932 [4] and it was at that time concluded that they were one of the causes of dysentery. Four years later Boyd [5] reported that these had been found to be identical in antigenic composition to the "Newcastle dysentery bacillus." At that time he recorded 231 isolations from cases of clinical dysentery, 8 from "menials undergoing routine examinations" and 1 from a convalescent case of typhoid fever. Dysentery cases of similar type occurring in this country probably would be considered relatively severe, since most revealed the bloody mucus characteristic of the more severe forms of the disease.

Downie, Wade, and Young [6] in 1933 reported five additional isolations from non-fatal diarrheal disorders in England and 1 from a relatively mild case of dysentery in Nigeria. The following year Whitehead and Scott [7] described 2 additional isolations, 1 from a fatal case in a boy of 12 years and the other from a severe infection in his brother, aged 8 years. A sister of 11 years was also admitted to hospital for a similar clinical disorder, but her recovery was prompt and no stool specimens were submitted for bacteriological examination. In South America, Hormaeche, Surroco, and Aleppo,[8] working in Uruguay, reported the isolation of 13 strains of this organism in 10 cases, with 6 fatalities. Apart from our own observations we have not found any published reports of the identification of the "Newcastle dysentery bacillus" in the United States, though Meyer [9] in California recently isolated an organism which conformed closely to this type.

Morphologically these organisms have been found to be Gram-negative, non-flagellated bacilli indistinguishable from other varieties of Shigella. With one possible exception it is agreed that they are non-motile. The Nigerian strain was thought to be motile on isolation but later, on repeated observations, it was found to be non-motile. This early, unconfirmed and atypical observation appears of very questionable significance. The indol reaction was consistently negative. Considering only the sugars commonly employed, all strains failed to ferment lactose, saccharose, or xylose, but promptly fermented glucose. Mannitol was not fermented by the strains isolated by Clayton and Warren[1, 2] or those described by Whitehead and Scott,[7] but was fermented by those isolated by Boyd,[4, 5] by Downie, Wade, and Young,[6] and by Hormaeche and coworkers.[8] Dulcitol was fermented late (2–10 days) by most of the organisms. A further variation in biochemical reaction is one which is customarily given much weight in classification. The first observers reported that when the various sugars were prepared with a peptone water base, a very small amount of gas was sometimes formed in those sugars which were fermented, but with an extract broth base (Lemco broth) there was very definite gas production. All described English strains have been found to produce at least a little gas. On the other hand, with one exception, all of Boyd's strains failed to produce any gas in either base but he points out that until recently non-motile gas formers were discarded. All South American isolations conformed in character to Boyd's "88." The type strain received by us from the Standards Laboratory, Oxford, England, is a moderately active gas producer when grown in an extract broth base, but in peptone water produces no gas which is demonstrable in

the Dunham fermentation tube. When it is grown in either Russell's or Krumweide's medium, three or four bubbles of gas appear.

In marked contrast to the variation in cultural findings it is agreed that antigenically the "Newcastle dysentery bacillus" is a sharply defined entity. There is a striking lack of any mention of even slight variations in serological reaction. Agglutinin absorption tests were reported by all of the authors quoted and they consistently concluded that in antigenic composition these organisms are identical.

The relationship to other pathogens has also been examined. Organisms which failed to show any significant cross-agglutination include *Eberthella typhosa*, *Shigella dysenteriae* Shiga, *S. dysenteriae* Sonne, *S. alkalescens* and a wide variety of Salmonella. There was, however, a definite cross-agglutination with certain of the Flexner strains. Absorption of Newcastle antiserum by a mixed Flexner suspension, as reported by Clayton and Warren,[2] removed all the Flexner agglutinins with only a very slight effect upon the agglutinins for the "Newcastle dysentery bacillus."

The sera of the patients, from whose stools the Newcastle organism had been isolated, were examined for specific agglutinins. The English investigators found titers of 1/40 to 1/640 in all clinical cases examined late in the disease or early in convalescence. The Nigerian case was serologically negative. Boyd[5] tested 68 cases and 52 showed no agglutination, 1 was positive in 1:25; 7 in 1:50; 4 in 1:125; and 4 in 1:250 dilutions or over. Some of the reported cases were also tested using Sonne and Flexner antigens. The results for the former were consistently negative and all but one failed to show any significant agglutination of any Flexner strain. Serum in the 1 case agglutinated the "Newcastle" organism in 1:640 dilution, and was positive with Flexner Y in 1:80 but negative with the other Flexner strains in 1:40 and above.

The British opinion concerning pathogenicity is indicated by Topley and Wilson[10] who include the "Newcastle dysentery bacillus" among those organisms which "undoubtedly give rise to dysentery in man."

OBSERVATIONS IN THREE REGIONS IN THE UNITED STATES

The plan of the study in Bernalillo County, New Mexico, and the laboratory procedures employed have been described in the first paper of this series.[11] During three summer and fall seasons we cultured 11,557 fecal specimens. On the average, one-third of these were collected from the individuals who were ill, or had recently recovered from an acute diarrheal disorder. The remainder came from recovered positive cases, from the healthy familial contacts, and from a generous sampling of representative population groups. Some one of 3 types of *Shigella dysenteriae* was isolated from 2,071 specimens and 2 varieties each from 5, thus providing 2,081 isolations. Approximately 80 per cent of each of the 3 organisms came from specimens collected from individuals who were or had recently been ill. It is seen in the tabulation that the "Newcastle dysentery bacillus" accounted for 332 (15.9 per cent) of the isolations, Sonne for 397 (19.1 per cent), and the Flexner group for 1,352 (65.0 per cent). Considering the subdivisions of the latter, the Flexner W strain was the most common of all the organisms, but 3 other members of this group were each encountered less frequently than either the Sonne or the Newcastle. The differences in the total per cent positive for the three seasons is largely explained by the adoption at the beginning of the second year of the more effective cultural procedure described elsewhere.[11] In addition, how-

ever, our records show a relative increase in the proportion of "Newcastle dysentery bacilli" from 7.1 per cent in 1936, to 14.4 per cent in 1937, and 17.0 per cent in 1938. This organism was first recognized by us during the winter of 1936–1937 in the course of the study of supposedly atypical strains. It was subsequently noted that the colonies on the medium used exclusively during the preceding summer (eosin-methylene blue with an extract agar base) were usually distinctly bluish. Failure to pick such colonies regularly possibly explains the relatively low percentage of "Newcastle dysentery bacilli" in the first year. The increase from the second to the third year reflects in part our increasing determination to obtain an adequate "follow-up" of all infections with this newly recognized organism. Our data do not permit us to conclude whether there was or was not any true increase in the incidence of "Newcastle" infections in this area.

In May, 1939, two of us (J. W. and T. DeC.) began a study in Dougherty County, Georgia, comparable to the one which we have completed in the Southwest. During the early weeks attention was restricted to case finding and diagnosis. Thus a majority of the specimens examined prior to September 1 were from individuals who were or had been ill. In the 4 months 737 specimens were examined and 157 yielded an identified variety of Shigella dysenteries. The 3 varieties were represented as follows: "Newcastle" 50 (31.8 per cent), Sonne 13 (9.0 per cent); and Flexner 94 (59.2 per cent). Organisms from other areas of Georgia were also sent to our laboratory for identification, and among these were found Newcastle strains. It is evident that in Georgia the "Newcastle dysentery bacillus" is widely scattered, and in Dougherty County formed an even greater percentage of the total isolations than in New Mexico.

In mid-June, 1939, through the cooperation of the Divisions of Preventable Diseases and Laboratories of the New York City Department of Health, an investigation of diarrheal diseases occurring in Manhattan was also undertaken. During the latter part of June there occurred an explosive epidemic involving chiefly the nurses in one of the larger hospitals in the city. There were 97 cases and the diagnosis was established bacteriologically in 77 of these. Twenty-three sub-clinical infections were also identified. The "Newcastle dysentery bacillus" was isolated from 248 fecal specimens examined in one or another of three different laboratories. All concerned with the study of the epidemic were strikingly impressed by the almost pure cultures of the "Newcastle" organisms commonly obtained from fecal material in the

TABLE 1

The Findings on Stool Cultures in Bernalillo County, New Mexico, During Three Summer and Fall Seasons

	Fecal Specimens Positive for "Shigella Dysenteriae"							
	1936		*1937*		*1938*		*Total*	
Variety of S. dysenteriae	*No.*	*%*	*No.*	*%*	*No.*	*%*	*No.*	*%*
"Newcastle"	11	7.1	84	14.4	227	17.0	332	15.9
Sonne	50	32.5	119	20.4	228	17.1	397	19.1
Flexner	93	60.4	379	65.2	880	65.9	1,352	65.0
Total	154	100.0	582	100.0	1,335	100.0	2,081	100.0
Fecal Specimens Examined	2,210		2,875		6,472		11,557	
Per cent Positive	7.0		20.2		20.6		18.0	

early stages of the infection. These disappeared as the individual recovered, or more usually a few days thereafter. The detailed findings in this relatively large outbreak of "Newcastle dysentery" are presented separately.[12]

From cases of endemic diarrheal disease in Manhattan, Flexner and Sonne strains have been isolated without difficulty, though in small numbers, but up to the end of September we found only one endemic infection due to the "Newcastle dysentery bacillus." Likewise in the study of endemic diarrhea in a large state institution, Flexner organisms were found with regularity and ease, but Sonne or "Newcastle" infections have as yet not been identified by us. The relative incidence of infections with the "Newcastle dysentery bacillus" in New York City appears to be lower than in the South or the Southwest.

The organisms which we have classified as "Newcastle" conform in all but four instances to the non-gas producing mannitol fermenting strains described by Boyd [4] as his "type 88." Thus they have the same cultural characteristics as the Flexner variety on the sugars commonly employed except for the late fermentation of dulcitol. We have, however, 4 isolations from 2 cases of the gas-producing mannitol fermenting variety. Serologically there was no apparent difference between those strains which produced gas and those which did not. All were agglutinated to titer by the same anti-Newcastle serum, prepared by the use of the gas-producing type-strain from the Standards Laboratory, Oxford, England. Using either the polyvalent diagnostic Flexner serum or the 5 type-specific sera, the Newcastle organisms were agglutinated in low dilutions only. Our polyvalent Flexner serum, for example, agglutinated the type-strains in dilutions of 1:6400, but this would not often give complete agglutination of the "Newcastle" strains above a 1:200 dilution.

We performed only a few tests on patients' sera in New Mexico. In the New York epidemic cases the sera of those who had been ill commonly agglutinated the Newcastle organisms in diagnostically significant dilutions but complete agglutination in 1:320 or above was not observed.

Clinically there has been no marked difference in the character of the cases which yielded one or the other of these 3 varieties of organisms. All degrees of severity and a wide variation in symptomatology have been noted for each type of infection. However, it is our impression that a detailed clinical analysis of an adequate series of cases will reveal significant variations in symptomatology, duration, and outcome, but from the observation of individual cases in the field, no reliable opinion could be formed as to the probable variety of organisms involved. In "Newcastle" infections, we have observed several very severe illnesses with some fatalities in children, but have never encountered the high fatality noted in the English and South American cases. However, even in the same household or epidemic, there have occurred, concurrently with severe infections, other positive cases with only a slight watery diarrhea and little or no general disturbance.

The epidemiological observations for the 3 varieties of infection reveal notable similarities. For all, carriers were not uncommon, multiple cases in the same family frequently occurred, and in the study of isolated groups or communities there was found some prevailing type of organism while the others were identified infrequently or not at all. Among the general population all 3 varieties tended to thrive under similar unhygienic environmental conditions. Possible and unconfirmed differences

concern chiefly the relative incidence and duration of the carrier state.

Identification of the "Newcastle dysentery bacillus" enabled us to transfer a substantial number of supposedly "atypical" organisms to an accepted group with known cultural characteristics and constant serological reactions. This simplified our laboratory procedures and, equally important to us, eliminated the annoyance engendered by an apparently pathogenic but unclassified group of organisms.

CLASSIFICATION AND NOMENCLATURE

Boyd [13] has recently recommended that the Flexner group be expanded to include the additional serological varieties recognized by him in India and the antigenically homogeneous but culturally differing "Newcastle" organisms. He recognizes that there can be legitimate differences of opinion as regards inclusion of the latter. In practical work, we have found it desirable to handle the "Newcastle dysentery bacillus" as an additional type of *Shigella dysenteriae*. It is our recommendation that, temporarily at least, it be so regarded, and that public health and clinical laboratories be prepared to identify accurately both the gas producing and non-gas producing strains of this recently described pathogen.

SUMMARY

The "Newcastle dysentery bacillus" has been found to be the cause of acute diarrheal disease in England, India, Africa, South America, and in three regions of the United States.

The cultural characteristics of this organism are described and the clinical and epidemiological findings compared with those for Flexner and Sonne infections.

The advantages of accurately identifying this organism are emphasized.

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Studies of the Toxicity of Basic Fuchsin for Certain Bacteria*

CASSANDRA RITTER, F.A.P.H.A.

Bacteriologist, State Board of Health, Lawrence, Kans.

THE growing practice of using dyes in media for their selective bacteriostatic powers has emphasized the necessity for having batches of dye of comparable toxicity.† With the inclusion of fuchsin lactose broth in *Standard Methods of Water Analysis* [1] as an alternative method of confirmation, basic fuchsin was added to the list of dyes to be checked for bacteriostatic power. Samples of each new batch of this dye submitted to the Commission on Standardization of Biological Stains for certification were sent to the writer for testing. After a favorable report on a sample of dye, certification "for use in bacteriological media" was added to the certification of basic fuchsin for its other uses, staining and in Endo medium.

Since 1935, 13 samples of basic fuchsin have been so certified. They fall into two groups as regards their bacteriostatic titer for *Escherichia coli* and *Aerobacter aerogenes*. Information as to their chemical composition and dye content, supplied by Dr. H. J. Conn, Chairman of the Biological Stain Commission, from tests made by the Color Laboratory, shows that these two groups correspond to the composition of each batch of dye. Those dyes predominantly pararosanilin form one group and those predominantly rosanilin form the other group, which have greater bacteriostatic powers. The present study was made to investigate the comparative bacteriostatic titers of the four lower homologs of the magenta series which make up the basic fuchsins, for several different strains of bacteria, and to establish if possible a standard for this dye when it is to be used in media for water analysis.

The dyes known commercially as basic fuchsin are usually a mixture of two or more homologs. They are triamino tri-phenylmethanes. As described by Conn [2] in *Biological Stains:*

> The fuchsins may have methyl groups introduced directly onto the benzene rings instead of into the amino groups; and the different fuchsins vary from one another in the number of such methyl groups present. There are four primary compounds theoretically possible, namely, with no methyl group, and with one, two, and three substituent methyl groups, respectively.

These homologs are: pararosanilin or Magenta O, with no methyl group; rosanilin or Magenta I, with 1 methyl group; Magenta II, with 2 methyl groups; and New Fuchsin or Magenta III, with 3 methyl groups. Pararosanilin is most often the chief constituent of the basic fuchsin dyes. Commercial rosanilin is very apt to be a mixture of Magenta O, I, and II. Magenta II,

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† Dr. Edmund K. Kline is the referee for studies on the toxicity of dyes for bacteria. The writer is an associate referee.

according to Conn,[2] is not encountered pure unless especially prepared. New fuchsin or Magenta III has not been furnished as a biological stain. These basic dyes are used as the chloride or the acetate salts.

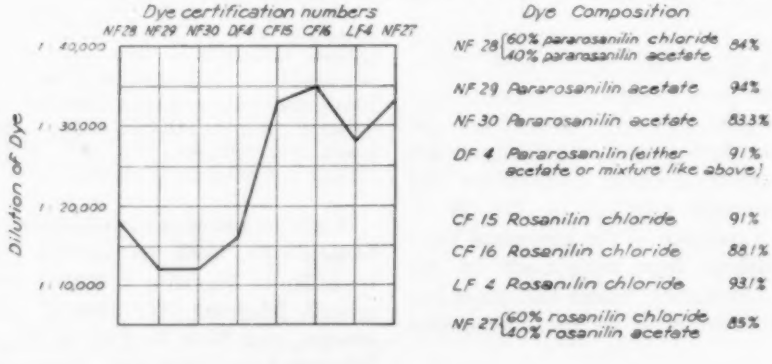
Anilin dyes in high concentrations as 1:100 will kill practically all organisms, as pointed out by Kolmer [3] in a review of the literature. When used in lower concentrations, some dyes show bactericidal and bacteriostatic properties for certain organisms, but have no effect on other organisms. This "selective activity" is the basis for much of the use of dyes in bacteriological media. Within a series of dyes, it was observed by Browning and Gilmour [4] that the substitution of alkyl groups increases the bactericidal properties of the dye. This principle is well demonstrated by the series of magenta homologs.

The 6 dyes used in the following experiments were: 2 commercial lots of basic fuchsin, and the chloride salts of the 4 lower basic members of the magenta series. These salts, furnished by the Color Laboratory, were prepared and purified by J. T. Scanlan,[5, 6] and C. G. Melin of the Industrial Farm Products Research Division, Bureau of Agricultural Chemistry and Engineering, U. S. Department of Agriculture, and used by them for experimental purposes. They are designated: pararosanilin chloride (Magenta O), rosanilin chloride (Magenta I), Magenta II, and new fuchsin (Magenta III). Information as to the composition of the commercial dyes was supplied by the Biological Stain Commission. These dyes, identified by their certification numbers, are DF-4, pararosanilin acetate or a mixture of acetate and chloride, dye content 91 per cent; and CF-15, rosanilin chloride, dye content 91 per cent.

The method used in the tests for certification and for the toxicity studies here reported is that of Kline.[7] The

CHART I

COMPARATIVE BACTERIOSTATIC ACTION OF EIGHT BASIC FUCHSIN DYES


Dye certification numbers
NF28 NF29 NF30 DF4 CF15 CF16 LF4 NF27
1 : 40,000
1 : 30,000
1 : 20,000
1 : 10,000
Dilution of Dye
Dye Composition
NF 28 (60% pararosanilin chloride, 40% pararosanilin acetate) 84%
NF 29 Pararosanilin acetate 94%
NF 30 Pararosanilin acetate 83.3%
DF 4 Pararosanilin (either acetate or mixture like above) 91%
CF 15 Rosanilin chloride 91%
CF 16 Rosanilin chloride 88.1%
LF 4 Rosanilin chloride 93.1%
NF 27 (60% rosanilin chloride, 40% rosanilin acetate) 85%

Test organism Escherichia coli

Points on the diagram represent the lowest dilution of dye permitting growth

TABLE 1

Comparative Bacteriostatic Action of Basic Fuchsin Dyes
Test organism: Escherichia coli

Designation of Dye	Para-rosanilin (Magenta O)	DF-4	Rosanilin (Magenta I)	CF-15	Magenta II	New Fuchsin (Magenta III)
Dilution of dye						
1:10,000	+ +	+ +	+ +	+ +	+ +	+ +
1:12,000	— —	+ +	+ +	+ +	+ +	+ +
1:14,000	— —	+ +	+ +	+ +	+ +	+ +
1:16,000	— —	+ +	+ +	+ +	+ +	+ +
1:18,000	— —	+ +	+ +	+ +	+ +	+ +
1:20,000	— —	— —	+ +	+ +	+ +	+ +
1:30,000	— —	— —	+ +	+ +	+ +	+ +
1:32,500	— —	— —	— —	+ +	+ +	+ +
1:35,000	— —	— —	— —	— —	+ +	+ +
1:45,000	— —	— —	— —	— —	+ +	+ +
1:47,500	— —	— —	— —	— —	+ +	+ +
1:50,000	— —	— —	— —	— —	— —	+ +
1:52,500	— —	— —	— —	— —	— —	+ +
1:55,000	— —	— —	— —	— —	— —	— —

+ Signs indicate bacteriostasis (no growth of bacteria).
— Signs indicate growth. Duplicate columns indicate duplicate tubes.
Tests in lactose-peptone broth pH 6.9; incubation at 37° C. for 48 hours.

bacteriostatic titer of each dye for each test organism was determined. The test medium was 1 per cent peptone, 1 per cent lactose, to which varying amounts of aqueous solutions of the dyes have been added. The organisms were grown until well established in the test medium. For the test, a young culture in the logarithmic phase of growth was so diluted that the amount used for each inoculation contained approximately 100 organisms. Duplicate tubes were made, incubated at 37°C., and examined after 24 and 48 hours for visible growth. Results were recorded in terms of the least concentration of the dye which will inhibit growth.

The 6 dyes tested were set up in parallel series for each organism, thus determining the bacteriostatic titer under the same conditions for each member of the dye series. This is a relative bacteriostatic titer, comparing each dye to each other dye; the results cannot be considered absolute for any specific dye and organism combination. Although each result was checked by more than one experiment, the results given in this paper are from one particular test for each strain of bacteria, of all the dyes.

The 10 organisms for which bacteriostatic titers were thus determined were selected from those which might be found in water. They are:

Gram-negative rods:	*Isolated from*
Escherichia coli	feces
Aerobacter aerogenes	water
Citrobacter	water
A slow lactose-fermenter designated "Hill,"[8] the normal fecal inhabitant of a healthy individual	feces
A slow lactose-fermenter, designated "414" originally thought to be the cause, with streptococcus, of a case of synergism	water
A streptococcus	water
The aerobic spore-forming organisms:	
Bacillus aerosporus	water
Bacillus subtilus (Marburg type) supplied by Kline	contaminated blood agar plate
Bacillus cereus supplied by Kline	water
Cereus-like spore-former, designated "15"	water

TABLE 2

Comparative Bacteriostatic Action of Basic Fuchsin Dyes
Dilution of Dyes Permitting and Inhibiting Growth under Conditions of the Test

(All figures represent duplicate tubes)

Designation of Dye	Para-rosanilin (Magenta O)	DF-4	Rosanilin (Magenta I)	CF-15	Magenta II	New Fuchsin (Magenta III)
Escherichia coli						
Growth	1:12,000	1:20,000	1:32,500	1:35,000	1:50,000	1:55,000
No growth	1:10,000	1:18,000	1:30,000	1:32,500	1:47,500	1:52,500
Aerobacter aerogenes						
Growth	1:5,200	1:6,500 *	1:12,000	1:13,000	1:18,000	1:20,000
No growth	1:5,000	1:6,000	1:11,000	1:12,000	# 1:16,000	1:19,000
Citrobacter						
Growth	1:7,000	1:11,000	1:17,000	1:18,000	1:28,000	1:33,000
No growth	1:6,500	1:10,000	# 1:15,000	# 1:16,000	1:27,000	1:32,000
414 slow lactose-fermenter						
Growth	1:5,500	1:9,000	1:15,000	1:16,000	1:21,000	1:23,000
No growth	1:5,200	# 1:7,000	1:14,000	1:15,000	# 1:19,000	1:22,000
Hill slow lactose-fermenter						
Growth	1:30,000	1:50,000	1:60,000	1:70,000	1:120,000	1:150,000
No growth	1:25,000	1:45,000	1:55,000	1:65,000	1:110,000	1:140,000
Streptococcus						
Growth	1:150,000	1:160,000	1:170,000	1:200,000	1:400,000	1:450,000
No growth	1:140,000	1:150,000	1:160,000	# 1:180,000	1:375,000	1:425,000
Bacillus aerosporus						
Growth	1:110,000	1:160,000	1:160,000	1:180,000	1:300,000	1:380,000
No growth	1:100,000	1:150,000	1:150,000	1:170,000	# 1:260,000	1:360,000
Bacillus subtilis						
Growth	1:300,000	1:350,000	1:400,000	1:450,000	1:600,000	1:800,000
No growth	1:250,000	1:300,000	1:350,000	1:400,000	1:500,000	1:700,000
Bacillus cereus						
Growth	1:300,000	1:500,000	1:900,000	1:1,000,000	1:1,500,000	1:2,250,000
No growth	1:250,000	1:450,000	# 1:700,000	1: 900,000	1:1,250,000	1:2,000,000
15 cereus-like organism						
Growth	1:400,000	1:600,000	1:1,000,000	1:1,200,000	1:1,800,000	1:2,100,000
No growth	1:350,000	1:500,000	1: 900,000	1:1,000,000	# 1:1,600,000	1:2,000,000

* One tube of dilution 1:7,000 showed bacteriostasis.
# At an intermediate dilution of the dye, one tube showed bacteriostasis and one showed growth.

The results of the experiments show the difference in susceptibility to dye action of each individual organism, as measured under the conditions of the tests; and they show that the relative titers for each dye homolog bear a relationship similar in order for each organism tested. The detailed results of the test with one of the organisms are given in Table 1. A summary of the results of the series of 10 tests is given in Table 2, which shows the values for the dilutions at which each dye permits or inhibits growth. The stronger bacteriostatic effect of each higher homolog of dye, in turn, is shown for each kind of bacteria. The differences in action are not constant as to amount for the organisms tested, but are constant as to direction. Thus pararosanilin is always the least inhibitory of the series, and new fuchsin the most inhibitory. The two samples of commercial dye act very much as do the samples of the salts of which they are largely composed, exhibiting an inhibitory power greater than that of the pure salts but not so great as that of the next higher homolog. This suggests that the commercial dyes contain small amounts of the higher homologs.

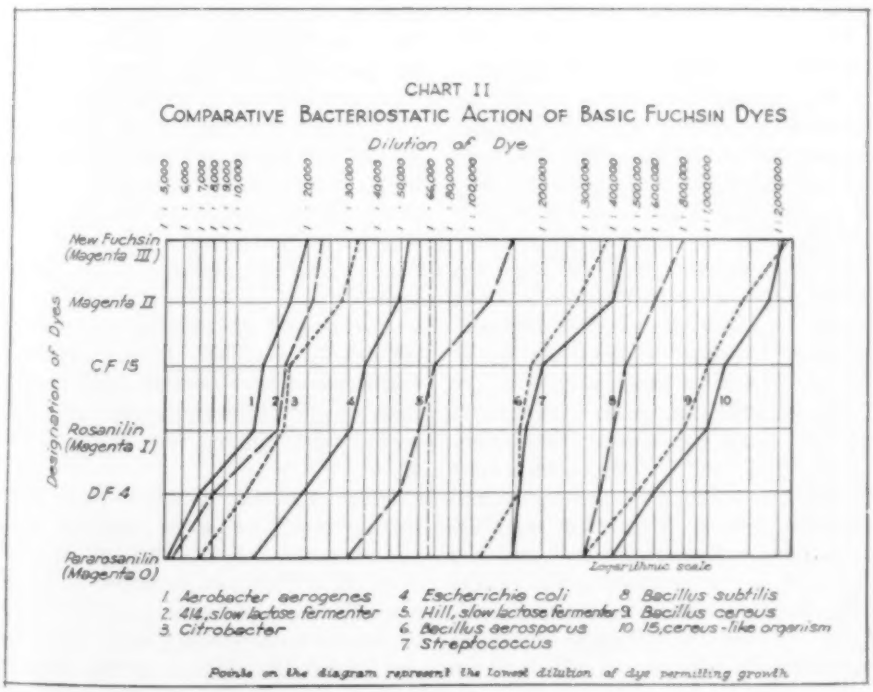
The part that the alkyl group plays in heightening the toxicity of a dye is clearly indicated in this series. The addition of each new methyl group increases the bacteriostatic titer of that homolog for each of the test organisms. The absence of effect from the chloride

or acetate anion is suggested by results of titrations of commercial batches of dye. In Chart I are given the results of 7 such representative dyes, titrated for bacteriostatic action against *Escherichia coli*. They were compared with dye number CF-15, selected as the standard in tests for certification. The accompanying information as to composition and dye content was furnished by the Color Laboratory.

It will be noticed in Chart I that although there are differences in the titers of the dyes within each group, the difference is not so great as that between the groups of pararosanilin and rosanilin dyes. The lack of correlation between per cent of dye content and bacteriostatic action indicates that these commercial dyes are not pure, but contain small amounts of the higher homologs, as Magenta II.

The selective bacteriostatic power of basic fuchsin for the organisms is evident. The Gram-negative rod forms are inhibited by comparatively low dilutions of the dyes, ranging for pararosanilin from 1:5,000 to 1:25,000. The Gram-positive organisms are inhibited by higher dilutions; for the streptococcus the inhibiting value of pararosanilin is 1:140,000. The spore-producing organisms are the least dye-tolerant, *Bacillus cereus* being inhibited by a 1:250,000 dilution of pararosanilin. Relationships among the different bacteria are suggested by the similarity of some of the bacteriostatic titers, such as those with *Aerobacter aerogenes* and Citrobacter.

Basic fuchsin is incorporated in fuchsin lactose broth in water analysis for its selective bacteriostatic action. The concentration used is 0.0015 per cent or 1:66,000. This concentration of pararosanilin or of rosanilin would have no effect on the members of the coliform group as tested in this study. Magenta II and Magenta III have not been furnished for biological use. The relationships are shown in Chart II in which



an extra line is drawn at the dye concentration of the present standard of 1:66,000. The Hill strain of slow lactose-fermenting bacteria of fecal origin, is inhibited by the sample of commercial rosanilin. Although it would be desirable to isolate this organism when it is present in water, it must be noted that routine methods of water analysis would not detect its presence. The spore-forming organisms are inhibited by these dyes in dilutions much higher than those used in media. The streptococcus is also inhibited, which in itself might not be desirable, but false positive results in water samples caused by a symbiotic combination having streptococcus as one of the bacteria involved, would not develop. The more recently suggested [9] concentration of dye for fuchsin lactose broth of 0.0025 per cent or 1:40,000 would have a similar effect. It is realized that the medium in which the dye is used is not the same as that in which these tests are made; but the comparative bacteriostatic action of the dyes would not differ.

The amount of basic fuchsin to be used for bacteriostatic action against a certain selected organism should be varied in accordance with the chemical composition of the dye. The difference in inhibitory effect of the homologs may be equalized in many cases by use of a different dye concentration. Numerical values for amounts of these homologs showing the same bacteriostatic power cannot be given because the difference in power between the homologs is not the same for all organisms.

The variations of results within a test set were much the same as those mentioned by Kline.[7] Titrations with most of the organisms were consistent and could be checked. Exceptions were the fecal strains *Escherichia coli* and the Hill slow lactose-fermenter. The results with these organisms were always uniform for the bacteriostatic titers of pararosanilin chloride and DF-4, also a pararosanilin dye. With the other homologs, especially Magenta II and Magenta III, the titers were sometimes so high as to be beyond the range of dilutions used. The results with these two organisms as here reported, were checked by several trials. The occasional variations noted suggest that pararosanilin would be somewhat preferred as a bacteriostatic agent when the isolation of *Escherichia coli* is involved; and that Magenta II and new fuchsin (Magenta III) are unsuitable.

SUMMARY AND CONCLUSIONS

Six dyes which are included in the general term basic fuchsin were tested for bacteriostatic titer against 10 strains of bacteria which might be found in water. These dyes are the homologs pararosanilin or Magenta O; rosanilin or Magenta I; Magenta II; and new fuchsin, or Magenta III; and two commercial dyes, one pararosanilin and one rosanilin.

The results for all organisms bear a relative titer corresponding to the number of methyl groups in the dye radical, the bacteriostatic titer increasing with the larger number of methyl groups.

The two commercial dye samples showed bacteriostatic titers only slightly higher than those of the pure salts of which they are largely composed. This suggests the presence in these dye batches of small amounts of the higher homologs.

The results of tests of a series of commercial samples of basic fuchsin, composed of both acetate and chloride salts, suggest that the anion has small part in determining the bacteriostatic titer.

Basic fuchsin is used in fuchsin lactose broth for water analysis in a concentration of 0.0015 per cent or 1:66,000. This concentration of pararosanilin or of rosanilin would eliminate unwanted spore-forming organisms but not inhibit the coliform group, accord-

ing to the experiments here reported.

Either pararosanilin or rosanilin dyes may be used in fuchsin lactose broth where bacteriostatic action is desired. The pararosanilin dyes are preferable, as the other homologs at times exhibit an erratic inhibitory effect on the *Escherichia coli* members of the coliform group. Magenta II and Magenta III are not suitable.

All samples of basic fuchsin submitted for certification up to this time have been found satisfactory in accordance with the results of these experiments. Tests of new batches of the dye may be made by determining the bacteriostatic titer, in comparison with the titer of the standard dye, for one coliform group organism and one aerobic spore-forming organism.

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The National Plumbing Laboratory*

FRANCIS M. DAWSON, M.C.E., F.A.P.H.A., AND
A. A. KALINSKE

Iowa Institute of Hydraulic Research, Iowa City, Iowa

THE National Plumbing Laboratory was organized in November, 1938, and has been functioning now for about a year. A year is but a short time for information regarding any institution to be broadcast adequately and correctly through the entire range of any wide extended group of professional men. Doubtless many who are potentially concerned with the work of the Laboratory are as yet unaware of the full nature and extent of the services it is in a position to render them; others may have in their minds certain misapprehensions relative to the exact place which this institution aspires to fill in the field of plumbing. Inevitably, as in any new development, certain initial prejudices must be met and explained away. Such being the case, we believe it fitting at the present time, even at the expense of some repetition, that the more important details regarding the National Plumbing Laboratory should be explained and publicized. That is the purpose of this short paper.

During the last few years various organizations and individuals acquainted with the problem of water pollution due to faulty plumbing fixtures have realized that the elimination and correction of such fixtures must be carried out. This can be done adequately only if there is a neutral, centralized agency to test and report on the hundreds of different fixtures and devices on the market. Because individuals differ in regard to what constitutes a safe fixture so far as water pollution is concerned, various standards are developed in many localities. For example, the hydraulics and pneumatics of the problem of backsiphonage is far too complex and varied to insure that uniform and proper tests will be made in every different testing laboratory established.

In consideration of these facts, the National Association of Master Plumbers, being one of the organizations vitally interested in the whole problem of plumbing and water pollution, promoted the establishment of a group that would serve as an unbiased, national testing and reporting agency for various plumbing fixtures and protective devices. The outcome of this promotional effort was the organization of the National Plumbing Laboratory, which was incorporated as a non-profit organization with a duly constituted board of directors in order that this group might have legal entity. The sole functions of this board are to take care of finances and to appoint the Council.

The Council is the body which has the sole power and function to develop testing methods and standards, to pass on test reports, and to determine whether or not various fixtures or devices are acceptable for listing. It consists of 12

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members, of which 8 must be men interested in public health, but not actively engaged in the manufacture, sale, or installation of plumbing equipment. They receive no pay and have no financial interest in any plumbing fixture or device. As now constituted, the Council consists of the following members:

1. M. W. Cowles, Health Officer, Hackensack Water Company, New Milford, N. J.
2. L. V. Carpenter, Professor of Sanitary Engineering, New York University, New York, N. Y.
3. B. W. Cullen, Superintendent, Water Pipe Extension Division, City of Chicago, Ill.
4. A. J. Farrell, Chief Plumbing Inspector, State of Oregon, Portland, Ore.
5. W. Scott Johnson, Chief Public Health Engineer, State of Missouri, Jefferson City, Mo.
6. V. M. Ehlers, Director, Bureau of Sanitary Engineering, State Board of Health, Austin, Tex.
7. A. R. McGonegal, former Chief Plumbing Inspector, District of Columbia.
8. D. C. Williams, Commissioner of City of Cedar Rapids, Iowa.
9. L. J. Kruse, Master Plumber, Oakland, Calif.
10. John J. Downey, Master Plumber, Boston, Mass.
11. H. L. Hopkins, Master Plumber, Charlotte, N. C.
12. F. P. Moss, Master Plumber, Miami, Fla.

The foregoing group adopted on November 30, 1938, the procedure that would be followed in the testing and accepting for listing of plumbing fixtures and various protective devices. It has the authority to select the testing agency which at present is the Iowa Institute of Hydraulic Research of the State University of Iowa, Iowa City, Iowa.

Any primary manufacturer of water-using plumbing equipment can submit apparatus for test. However, such apparatus or device must be in a form ready for manufacture; it cannot be simply a rough assembly or model. Complete drawings and all advertising and publicity material must be submitted with the device for review by the Council.

After a device has been investigated by the testing agency, a report is submitted to each member of the Council. Each member then votes for or against acceptance of the apparatus. Favorable votes of three-quarters of the members of the Council will permit the device to be placed on an accepted list, which list will be properly publicized. If a device fails of acceptance, its limitations are reported to the manufacturer along with suggestions relative to its improvement. No other publicity is at present given to non-acceptable contrivances.

The many minor details which pertain to the functions of the Council have all been listed in a booklet, *Procedure for the Council*.* Considerable time and effort have been put forth by the Council in adopting the rules under which the National Plumbing Laboratory functions. Interested person unfamiliar with the full purposes and aims of this organization would do well to study this booklet carefully. It sets forth in simple, direct, and exact language the ways and means by which the National Plumbing Laboratory hopes to attain its purposes and goal, namely that of preserving the purity of the water supply by testing plumbing equipment in a scientific and unprejudiced manner.

I have heard comments that the National Plumbing Laboratory duplicates the work of the National Bureau of Standards and that each is at cross-purposes with the other. The National Plumbing Laboratory is an organization which is attempting on a national scale to promote properly designed plumbing fixtures and to eliminate those that are dangerous to the public health. Its services are free to any manufacturer and the information it obtains is avail-

* This pamphlet may be secured by addressing the Secretary, National Plumbing Laboratory, 917 Fifteenth Street, N. W., Washington, D. C.

able to all plumbing inspectors, boards of health, health officials, etc.

The Bureau of Standards, however, is not concerned directly with the testing of plumbing fixtures and devices except in so far as testing and preparing of standards is necessary in connection with government work. The Bureau tests fixtures and reports on them at the request of a governmental agency and not at the request of some private individual. Many of its reports are of a confidential nature and are not publicly available. The National Plumbing Laboratory and the Bureau of Standards, therefore, do not in any way displace or replace each other's work. In fact, the testing agency of the National Plumbing Laboratory has had close contacts with the Bureau and has interchanged information on test procedures and standards adopted.

The National Plumbing Laboratory can be of great help to plumbing inspectors who do not have the time or financial aid to test plumbing fixtures, in order to determine their functioning as far as possible water pollution is concerned. The opinion of 12 men, such as compose the Council, certainly is more correct and unbiased than the personal opinion of a single inspector. Many inspectors, however, failing to avail themselves of the work of the National Plumbing Laboratory, attempt in their own inadequately equipped laboratories to run tests and set up their individual standards of performance.

During the first year, as was to be expected, the National Plumbing Laboratory received many discouragements, but I personally believe that the reasons for its existence are sufficiently important, and its aims and purposes sufficiently worthy to insure its continued influence and usefulness. The National Plumbing Laboratory can with proper support do much to eliminate on a national scale the use and installation of improper plumbing fixtures and the use of "gadgets" for the prevention of back-siphonage. It can also bring standardization to the back-siphonage problem, thus eliminating the present unsatisfactory situation. Every state and every city seems to have some different regulation in regard to the prevention of back-siphonage from this or that fixture. Certainly the bringing about of some uniform methods of solving this problem should be of importance to the manufacturers of plumbing equipment. This would also assist materially the work of public health engineers and inspectors.

In many respects the future of the National Plumbing Laboratory will depend on the support given to it by members of the American Public Health Association. To this end we believe it would be worth the while of all those concerned with the supplying of pure water to acquaint themselves with the purposes and functions of the National Plumbing Laboratory. It should be borne in mind that the Council members receive no pay and have no financial interest in any plumbing fixture or device, and that no charge is made to the manufacturer for testing any device.

The National Association of Master Plumbers has given this Laboratory an auspicious start and it is now functioning in a satisfactory way. The worthiness of its efforts and purposes has been proved. It should, therefore, receive the present encouragement and support of other organizations and groups interested in keeping water safe from the source to the consumer

Comparative Efficiency of Endo, Lithium Chloride Endo, Desoxycholate-Citrate, and Bismuth Sulfite Media for the Isolation of Eberthella Typhosa*

CATHERINE R. MAYFIELD AND MAUD GOBER

Division of Laboratories, Mississippi State Board of Health, Jackson, Miss.

THE technical phases of the isolation of the pathogenic bacteria and their subsequent identification present many difficulties. The direct microscopic examination of the specimens by means of stained smears so helpful in cases of many infections, is utterly useless in the isolation of *Eberthella typhosa* from feces specimens because there are no distinctive morphological or tincture characteristics to differentiate *E. typhosa* from the nonpathogens commonly found in feces. Agglutination tests [1] with patient's serum cannot be relied upon as diagnostic evidence of the presence of *E. typhosa* in a locality where large masses of the population have repeatedly been given vaccine, as is the common practice in most of the southern states. The only certain means of establishing the nature of an infection is the isolation of the causative organism.

Many different media and procedures have been devised for the isolation of *E. typhosa*. Almost every bacteriologist has his favorite procedure which seems to be successful in his own hands; consequently he hesitates to accept new methods or modifications of old ones. Probably for this reason Endo medium or some modification of it is still used by a majority of bacteriologists. The addition of 0.5 per cent lithium chloride to the Endo medium proved an effective medium for the isolation of *E. typhosa* in the hands of Havens and Mayfield.[2] The Tennessee Bureau of Laboratories [3] have used this medium with satisfactory results. Wilson and Blair's [4] bismuth sulfite medium is now being used very widely. Sellers, Morris, and Reynolds [5] report the superiority of bismuth sulfite agar over the Endo medium in a comparison of fecal specimens streaked on Endo and bismuth sulfite media. Cope and Kasper [6] in a comparative study of Endo and bismuth sulfite media, favored the use of both media, but found it inadvisable to discontinue the use of Endo agar in favor of any recently developed differential plate medium. Leifson's [7] desoxycholate-citrate agar is recognized by many as an excellent medium for the isolation of *E. typhosa* and *Shigella dysenteriae*.

The study presented in this paper is a report of the comparative efficiency of plain Endo, lithium chloride Endo, desoxycholate-citrate, and bismuth sulfite culture media for the isolation of

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E. typhosa from routine feces specimens received by the Laboratories of the Mississippi State Board of Health. These feces specimens were collected by the county health officers and nurses and not by special investigators. In the tabulations of this study it will be noted that the specimens were classified as to the history; whether or not they were cases, releases, or carriers. This was done in an attempt to determine whether or not any one medium was more efficient in the isolation of *E. typhosa* for any particular group.

LABORATORY PROCEDURES

There is as great a lack of uniformity in procedures used for the collection of material for cultures and identification of bacteria isolated as in the media used for isolation. Feces specimens are collected in a screw top, 1 oz. glass jar containing a 30 per cent solution of glycerine (in 0.85 per cent salt solution) which has been autoclaved at 121°C. for 15 minutes. Instructions for inoculating the glycerine with a small amount of feces (not to exceed 1 gm., about the size of a bean) are given on each bottle. Specimens must be forwarded to the laboratory in order to have them arrive not later than 48 hrs. from the time of collection. Specimens having an excessive amount of feces and those over 48 hrs. old from the time of collection until it reaches the laboratory are marked unsatisfactory and another specimen is requested. Of 15,000 specimens examined in this laboratory less than 5 per cent of these specimens have been unsatisfactory because special emphasis has been placed on this for the past 6 years.

The specimens are inoculated on the media used for isolation the day they are received. These specimens are then placed in a 20°C. refrigerator and inoculations are made on the second and third days. The number of additional positive cultures obtained by inoculating the specimens on the second and third days is shown in the tables that follow in the comparative efficiency of the media. The inoculated plates are incubated at 37°C. for 18 hrs. The plates are then examined and suspicious colonies fished to Russell's double sugar tubes. Cultures giving the characteristic reaction of typhoid on this medium are tested for motility and agglutination by the macroscopic slide method with anti-typhoid and anti-polyvalent dysentery sera. It has been our experience that *E. typhosa* does not cross-agglutinate with anti-polyvalent dysentery serum but that some of our Flexner strains of dysentery bacilli will cross-agglutinate with the anti-typhoid serum. Tube agglutination is done on all dysentery cultures in which cross-agglutination occurs in the macroscopic slide test. Fermentation tests are made routinely using the following carbohydrates: xylose, lactose, dulcitol, mannitol, rhamnose, saccharose, and sorbitol. The basic medium for the carbohydrates is 0.5 per cent semi-solid beef extract agar with 1 per cent Andrade's indicator. The semi-solid agar is tubed in 2 cc. amounts and autoclaved 30 minutes at 121°C. To these tubes are added 0.1 cc. of 20 per cent concentration of the carbohydrates (which are made by weighing the sugars into sterile bottles containing the proper amount of distilled water). These tubes are then sterilized in the Arnold 1 hr., at 100°C., incubated for sterility, and tested with a known culture of *E. typhosa* for typical reactions before being used. Tubes of Simmon's [8] citrate agar and Jordon and Harmon's [9] sodium potassium tartrate agar are also inoculated from the Russell's slant at the time the carbohydrates are inoculated. At the time of inoculating the carbohydrates, citrate, and tartrate, a very small amount of culture on the Russell's slant is emulsified in Difco tryptone broth and restreaked on a plain Endo plate.

If the restreak on plain Endo shows that the culture is not pure, colonies are fished from this plate to Russell's double sugars and again tested in the same manner. The tryptone broth culture, after 24 hours' incubation, is tested for the presence of indol. Motile cultures which agglutinate anti-typhoid serum giving acid with no production of gas in xylose usually, in mannitol, and in sorbitol, acid in the butt of tartrate, no reaction in citrate agar, are considered *E. typhosa*. If a strain is isolated which gives the cultural reactions for typhoid but which does not agglutinate with the anti-typhoid serum, it is sub-cultured daily on a plain agar slant. Usually 6 to 8 such transfers are sufficient to render the culture agglutinable.

COMPARISON OF PLAIN ENDO AND 0.5 PER CENT LITHIUM CHLORIDE ENDO FOR THE ISOLATION OF E. TYPHOSA

Many typhoid bacteria may be present in a specimen of feces which will not appear on the plain Endo plate unless the rapidly developing colonies of the normal fecal bacteria are restrained. The addition of lithium chloride to Endo medium restrains the fecal colonies and permits the appearance of the typhoid colonies.

This comparative study of the advantages of lithium chloride Endo medium and plain Endo medium was made with a large series of specimens of which 477 were positive for *E. typhosa*. Difco Endo medium was used in this series. The 0.5 per cent lithium chloride Endo medium was prepared by adding a sterile 20 per cent concentration of lithium chloride to the Difco Endo medium. The results of this comparison are given in Table 1.

In no instance in this series was the Endo plate positive when the lithium chloride Endo was negative. On the other hand there were 203 specimens which would have been reported negative if only the plain Endo medium had been used. Of the 477 positive specimens for *E. typhosa*, 51 specimens streaked on plain Endo and 71 specimens streaked on lithium chloride Endo would have been reported negative had only one day's plating been done.

Since many laboratories prefer the use of Endo medium prepared in the laboratory in preference to Difco Endo, a comparative study of Difco Endo, with and without the addition of lithium chloride and Endo prepared by the Laboratories of the Mississippi State Board of Health was made. The Endo medium prepared by the laboratory consisted of 10 gm. peptone, 5 gm. beef extract, 30 gm. agar in 1,000 cc. water,

TABLE 1

Comparison of Endo and Lithium Chloride Endo (Difco) Media for the Isolation of E. Typhosa from Feces

477 Positive Specimens

	Endo Medium Repeated Plating			*0.5% Lithium Chloride Endo Repeated Plating*		
History of Specimens	*24 hr.*	*48 hr.*	*72 hr.*	*24 hr.*	*48 hr.*	*72 hr.*
Case	78	19	6	151	15	14
Release	35	3	0	73	10	5
Carrier	110	18	5	182	15	12
Total by Plating	223	40	11	406	40	31
Total Positives			274			477

adjusted to 7.8–8.0 pH measured in 100 cc. amounts, and autoclaved 30 minutes at 121°C. To the base agar was added 1 per cent lactose and 1 cc. of a 10 per cent concentration of sodium sulfite to which 0.5 cc. saturated alcoholic solution of basic fuchsin (3 gm. of basic fuchsin in 100 cc. 95 per cent alcohol) had been added. The formula used in the preparation of Difco Endo's medium by the Difco Laboratories consists of 10 gm. Bacto-Peptone, 10 gm. Bacto-Lactose, 3.5 gm. di-potassium phosphate, 15 gm. Bacto-Agar, 2.5 gm. sodium sulfite, 0.4 gm. of Bacto-Basic Fuchsin (DF-4) in 1,000 cc. of water, with final pH 7.5. Forty-one and one-half gm. of the dehydrated medium is mixed with 1,000 cc. of distilled water and autoclaved 15 minutes at 121°C. The comparison of the two media, with and without lithium chloride, is given in Table 2.

TABLE 2

Comparison of Difco (Dehydrated) Endo Medium and Endo Medium Prepared in State Hygienic Laboratory—with and without Lithium Chloride for Isolation of E. Typhosa

348 Specimens—195 Positive Cultures

	Endo Medium State Hygienic Laboratory						*Endo Medium Difco Laboratories*					
	Plain Endo Repeated Plating			*0.5% LiCl Endo Repeated Plating*			*Plain Endo Repeated Plating*			*0.5% LiCl Endo Repeated Plating*		
History of Specimen	*24 hr.*	*48 hr.*	*72 hr.*	*24 hr.*	*48 hr.*	*72 hr.*	*24 hr.*	*48 hr.*	*72 hr.*	*24 hr.*	*48 hr.*	*72 hr.*
Case	14	4	2	17	2	4	18	2	2	31	2	2
Release	5	1	0	6	0	1	6	1	0	14	1	0
Carrier	77	8	4	89	12	4	95	10	9	139	6	0
Total by Plating	96	13	6	112	14	9	119	13	11	184	9	2
Total Positives			115			135			143			195

The Difco Endo medium with 0.5 per cent lithium chloride added was positive in 195 specimens as compare with 143 positive specimens on plain Difco Endo medium. The plain Difco Endo medium yielded 143 positive specimens as compared with 135 positive specimens on lithium chloride Endo medium prepared by the laboratory. Plates with spreaders made the isolation of *E. typhosa* difficult in many instances on the laboratory prepared medium. This difficulty was not encountered with the Difco Endo medium. The laboratory prepared Endo plates were overgrown with fecal bacteria in many instances where difficulty was not found in isolating *E. typhosa* from the Difco Endo plates.

Some laboratories use two plates of plain Endo medium for the isolation of *E. typhosa* from feces specimens—streaking the second plate as a continuation of the first plate without re-inoculating the loop. A series of 344 feces specimens were cultured in a study comparing the two plates of plain Difco Endo medium, streaked in the above manner, with one plate of 0.5 per cent lithium chloride Endo medium. Table 3 is a tabulation of this series.

In this series of 344 specimens examined on two plates of plain Endo and one plate of lithium chloride Endo, 178 specimens were positive for *E. typhosa*. Of the 125 specimens positive on the first plain Endo plate, 6 of these positive specimens were negative on all 3 days' plating on the second plate from the same loop. Of the 142 specimens

TABLE 3

Comparison of One Plate of Lithium Chloride Endo Medium and Two Plates of Plain Endo Medium in Isolation of E. Typhosa from Feces

344 Specimens—178 Positive Specimens

				Media Used								
				Plain Endo								
				1st Plate from Loop			*2nd Plate from Loop*			*0.5% LiCl Endo*		
	Specimens Exam.											
History of Specimens	*Total*	*Neg.*	*Pos.*	*24 hr.*	*48 hr.*	*72 hr.*	*24 hr.*	*48 hr.*	*72 hr.*	*24 hr.*	*48 hr.*	*72 hr.*
Case	38	26	12	6	0	1	7	0	1	9	2	1
Release	89	68	21	7	1	1	10	0	1	14	2	5
Carrier	217	72	145	99	6	4	113	4	6	138	4	3
Positive on 1 plain Endo Plate Only						6			17			
Positive on LiCl Negative on Plain Endo												30
Total	344	166	178			125			142			178

positive on the second plate, 17 of these were negative on all 3 days' plating on the first plate of plain Endo medium. The total number of positive specimens isolated on plain Endo medium, using 2 plates of Endo, was 148. There were 30 specimens positive on the one plate of lithium chloride Endo which were negative on all 3 days' plating on both plates of plain Endo medium. In no instance was the lithium chloride Endo medium negative where either of the plain Endo plates was positive in this comparison. In fact, only twice in a series of over 15,000 feces specimens examined was the plain Endo plate positive when the lithium chloride Endo plate was negative. It will be noted in Table 3 as well as in Tables 1 and 2 that a large number of specimens were positive on the second and third days' streaking which were negative on the first day's streaking. An average of about 25 per cent of the specimens plated were positive on the second and third days' streaking which would have been reported negative if only the first day's streaking had been made.

COMPARISON OF LITHIUM CHLORIDE ENDO, BISMUTH SULFITE, AND DESOXYCHOLATE-CITRATE AGARS FOR THE ISOLATION OF E. TYPHOSA

The lithium chloride Endo and bismuth sulfite agars used in this comparison are the dehydrated media prepared by the Difco Laboratories. The desoxycholate-citrate medium used was prepared by Baltimore Biological Laboratories. The bismuth sulfite and desoxycholate-citrate agars were weighed into flasks containing a given amount of sterile distilled water, melted, and poured. All media were poured 24 hours before the time for them to be used to insure sterility and allow the plates to be free from water of condensation. These plates were kept free from contamination in the cold room and used as long as a week later with satisfactory results. Specimens were streaked on these 3 media for 3 successive days as in the

TABLE 4

Comparison of Lithium Chloride Endo, Desoxycholate-Citrate and Bismuth Sulfite Agars for Isolation of E. Typhosa from Feces

724 Specimens Positive on One or More Media

	Media Used in Isolation								
	0.5% LiCl Endo Repeated Plating			*Desoxycholate-Citrate Repeated Plating*			*Bismuth Sulfite Repeated Plating*		
History of Specimen	*24 hr.*	*48 hr.*	*72 hr.*	*24 hr.*	*48 hr.*	*72 hr.*	*24 hr.*	*48 hr.*	*72 hr.*
Case	165	28	22	190	50	14	143	76	39
Release	75	25	13	70	27	9	63	39	22
Carrier	168	28	11	187	34	10	149	42	28
Total Pos. by Streaking	408	81	46	447	111	33	355	157	89
Total Pos. by Media			535			591			601

other series of comparison. The results of the comparison are given in Table 4.

There were 724 specimens positive on one or more of the 3 media used. Of the 724 positive specimens, 535 (74 per cent) were positive on 0.5 per cent lithium chloride, 591 (82 per cent) on desoxycholate-citrate and 601 (83 per cent) on bismuth sulfite. The additional positives obtained by streaking the specimens the second and third days on these media were 127 positives (24 per cent) on 0.5 per cent lithium chloride Endo, 144 positives (24 per cent) on desoxycholate-citrate, and 246 positives (40 per cent) on bismuth sulfite. Attention is called to the presence of some strains of *E. typhosa* which do not give the characteristic reaction of bismuth sulfite. Nineteen of the 601 positives found on this medium failed to produce typical colonies even after 48 hours' incubation. These strains grew as small colorless or light green colonies on the plates. However, these colonies are characteristic of typhoid growth on other media and should not be overlooked if one does not rely entirely on the production of the black color for typical typhoid colonies. No one medium was found to be positive on all of the 724 specimens. There were 195 specimens which were positive only on one of the 3 media. These results are given in Table 5.

It will be noted that 42 specimens would have been reported negative if lithium chloride Endo medium had not been used; 65 specimens if desoxycholate-citrate had not been used; and 88 specimens if bismuth sulfite had not been used. The lithium chloride Endo medium is not so inhibitory as the desoxycholate-citrate and bismuth sulfite media. For this reason some of the specimens were positive on lithium chloride that were sterile for the 3 days on both the desoxycholate-citrate and bismuth sulfite. Likewise the lithium chloride Endo medium was overgrown on some specimens where the desoxycholate-citrate and bismuth sulfite were positive. *B. proteus,* which often spreads over the entire plate on lithium chloride Endo medium is practically inhibited or does not spread on bismuth sulfite.

SUMMARY AND CONCLUSION

The findings in this study indicate that lithium chloride Endo medium is superior to plain Endo (both Difco and that prepared by the Mississippi State

TABLE 5

Specimens Positive on One Medium Only in Comparison of Lithium Chloride Endo, Desoxycholate-Citrate and Bismuth Sulfite Agar for the Isolation of E. Typhosa from Feces

195 Positive Specimens

	Media Used in Isolation								
	0.5% LiCl Endo Repeated Plating			*Desoxycholate-Citrate Repeated Plating*			*Bismuth Sulfite Repeated Plating*		
History of Specimen	*24 hr.*	*48 hr.*	*72 hr.*	*24 hr.*	*48 hr.*	*72 hr.*	*24 hr.*	*48 hr.*	*72 hr.*
Case	12	2	4	21	10	2	16	11	12
Release	10	3	2	7	2	1	7	12	8
Carrier	4	3	2	15	5	2	9	9	4
Total Pos. by Plating	26	8	8	43	17	5	32	32	24
Total Pos. by Media			42			65			88

Laboratories), using either one or two plates of the plain Endo medium.

In a comparison of lithium chloride Endo, desoxycholate-citrate, and bismuth sulfite agars for the isolation of *E. typhosa*, 724 positive cultures were isolated on one or more of the 3 media, with 535 (74 per cent) positives on lithium chloride Endo, 591 (82 per cent) positives on desoxycholate-citrate, and 601 (83 per cent) positives on bismuth sulfite. Of the 724 positive cultures isolated, 195 positive specimens were positive only on one of the 3 media, 42 on lithium chloride, 65 on desoxycholate-citrate, and 88 on bismuth sulfite.

There were 127 specimens (24 per cent) on lithium chloride, 144 (24 per cent) on desoxycholate-citrate, and 246 (40 per cent) on bismuth sulfite which were positive on the second and third days' plating that would have been reported negative if only one day's plating had been made.

No marked difference in the efficiency of lithium chloride, desoxycholate-citrate, and bismuth sulfite in the isolation of *E. typhosa* from specimens examined for diagnosis, release, or carrier has been noted. Bismuth sulfite yielded more positives than lithium chloride or desoxycholate-citrate in the examination of release specimens. Desoxycholate-citrate yielded more positives in the examination of carrier specimens. Both desoxycholate-citrate and bismuth sulfite yielded more positives than lithium chloride in examination of specimens for diagnosis.

Objection may be raised to the use of 3 media for the isolation of *E. typhosa* because of the expense and time required in the use of the media. On the other hand, it has seemed important in this laboratory to continue the use of these 3 media, streaking the specimens 3 days, when the elimination of any one media would mean the missing of 6 per cent on lithium chloride Endo, 9 per cent on desoxycholate-citrate, and 12 per cent on bismuth sulfite.

A great deal of time and expense has been involved by the health officers and nurses in an effort to submit to the laboratory the proper type specimens. Every effort made by the laboratory to render these field workers more efficient results is necessary when the failure to isolate *E. typhosa* from the specimens may result in further spread of the organism from missed cases or carriers.

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Studies on Typhus Vaccine Prepared from Agar-Tissue Culture*

SAMUEL H. ZIA, M.D., K. H. PANG, M.D., AND P. Y. LIU, M.D.

Department of Bacteriology and Immunology, Peiping Union Medical College, Peking, China

EVER since the discovery of *Rickettsia prowazeki* as the cause of typhus fever, constant efforts have been made to develop a method of obtaining the organisms in large enough numbers for the preparation of a prophylactic vaccine. Weigl [1] has achieved immunization with a vaccine prepared from the intestinal tract of artificially infected lice in which numerous rickettsiae are found. On the other hand, Zinsser and Castaneda,[2] based upon the observation that heavy accumulation of rickettsiae of murine type occurs in the peritoneal cavity of specially treated white rats, have prepared a vaccine from the peritoneal washings of such animals. Vaccine prepared by these procedures has been shown to give definitely favorable results both in experimental animals and in human practice. However, attempts have been continued to produce a vaccine by the cultural technic, a method which is more easily reproduced, more conveniently handled, and gives more regular results than the one depending entirely on materials obtained directly from infected insects or rats. The concurrent reduction in the expense involved with the use of cultural methods is an additional advantage not to be lightly overlooked especially when a large number of persons are to be immunized.

While Pinkerton and Hass [3] and Nigg and Landsteiner [4] were among the first workers to succeed in cultivating the rickettsiae *in vitro*, it was not until 1934 that Kligler and Ashner [5] first demonstrated the production of immunity in guinea pigs by means of a vaccine prepared from the growth in a modified Maitland culture. Zinsser and Macchiavello [6] have independently arrived at the same conclusion. However, it was soon evident to the latter workers that in spite of the improved cultures contained in large flasks,[7] the yield of rickettsiae was irregular, and frequently disappointing. Zinsser and his coworkers then continued to improve cultural methods with the final evolution of the "agar-tissue" culture.[8, 9] In this medium, the growth of rickettsiae has been found to be regularly and extremely heavy. At the same time, the method is even simpler than the modified Maitland culture. Vaccine has been prepared from the growth removed from agar tissue cultures and has given complete immunity to guinea pigs against large doses of passage virus.[10] Upon such an experimental basis, it seems clear that further study on the use of this vaccine both with experimental animals and in human beings should be carried out. This has been done in Peking, an

* Presented at the Third International Congress of Microbiology, New York, N. Y., September 2–8, 1939.

area endemic with typhus fever, with a local strain. The results of such a study, together with a brief description of the method which has been employed for the preparation of the vaccine, form the substance of this communication.

MATERIALS AND METHODS

Strain of typhus rickettsia used—A strain which was originally isolated from the blood of a patient in the Peking area in 1932 by Gajdos and Tchang has been employed.[11] This strain has been maintained by regular passage in guinea pigs and has been used for the production of vaccine by Weigl's method. As this vaccine has been shown to give good practical results,[12] it was chosen for our experiments. This rickettsia produced regular fever in guinea pigs after an incubation period of 6–7 days, showing no scrotal swelling at any time. However, smears made from the tunica exudate have shown from time to time occasional rickettsiae contained in the mononuclear cells. Cultures were easily initiated from the tunica material on both Maitland and agar tissue media.[13]

Method of cultivation—The agar tissue culture method has been used for the growth of the rickettsiae. As a detailed description of this method has recently appeared[10] it is only necessary to mention a few points in which departure from the original method has been taken. A slightly harder agar (2 per cent) containing human serum-Tyrode solution, was employed. This is used to minimize the presence of foreign proteins and obviates the necessity of washing the vaccine. On the 2 per cent agar, it has been found that maximum growth does not occur until the 14th day of incubation, which is much slower than on a softer agar. By grinding the infected tissue thoroughly, it is possible to inoculate sufficient fresh mouse embryonic tissue to make 8 to 12 tubes, and thus it is not difficult to multiply these cultures tenfold with each subsequent generation. However, one of the greatest obstacles to satisfactory use of this method is bacterial contamination, which can only be reduced to less than 10 per cent by persistent efforts and greatest care in details.

Preparation of the vaccine suspension—When the cultures were found to give heavy growth they were used for the preparation of vaccine. In the beginning it was thought that some uniformity in the rickettsia suspension might be obtained if the amount of fluid used to wash down the infected tissue varied according to the degree of growth seen under the microscope. For instance, if a smear from a certain culture should give the appearance of a moderately heavy growth, 1.5 cc. of fluid were used for washing the contents of this tube. On the other hand, if a smear from another tube should give that of a very heavy growth, 2.5 cc. of fluid were used. However, it was soon evident that such an arbitrary standardization based on the examination of one single piece of tissue was apt to give incorrect information. Experience further taught us that it is only possible to tell, by examining a single piece of tissue from each tube, whether that tube is good enough for making vaccine, so it was eventually decided to employ a uniform amount of 2 cc. for each tube until further standardization is possible.

The saline used to suspend the tissue bits contained 1:10,000 merthiolate, which is employed as a preventive against contamination during handling. The contents of 10 or more tubes were then placed in a mechanical glass tissue grinder. This grinder was run for 1 to 2 hours, until few intact cells could be seen, being placed in a bath of cool running water. Phenol was then added to effect a final concentration of 0.5 per cent. The vaccine therefore contains besides the rickettsia, much embryonic tissue, debris, and traces of human

serum. It has two preservatives, phenol at 0.5 per cent and merthiolate in final concentration of 1:10,000. The combination of these two reagents has been recently found by Falk and Aplington [14] to give additional bactericidal power which should kill the rickettsiae sooner than either alone. Before the vaccine was issued for use, sterility test, including inoculation into white mice, was always carried out.

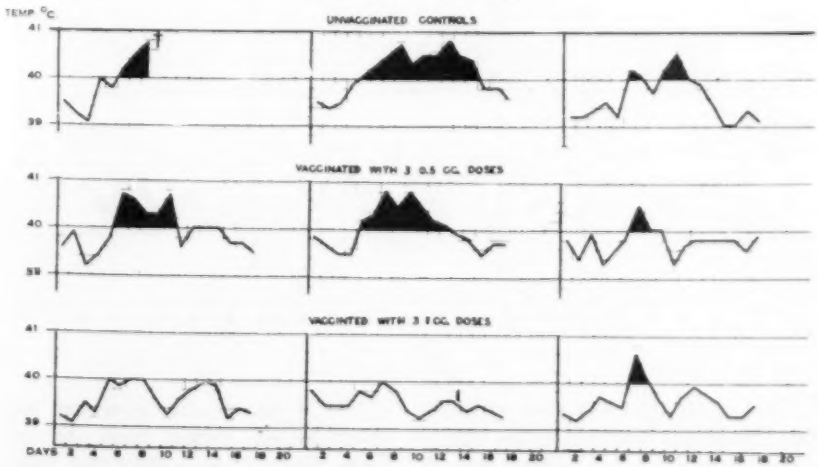
ACTIVE IMMUNIZATION OF VARIOUS LABORATORY ANIMALS AND HUMAN BEINGS

In order to evaluate the effectiveness of the vaccine prepared from tissue culture, rabbits were immunized for the determination of serological response, and guinea pigs for protection tests. The harmlessness of the vaccine was demonstrated on a monkey before use on human volunteers. The results may be presented in the following experiments:

Serological response of rabbits to vaccine—A series of 4 rabbits were given intravenously 3 doses of 1 cc. each at weekly intervals. The Weil-Felix reaction was followed each week. It was found that invariably the rabbit sera showed positive agglutination to *Proteus* X_{19} soon after immunization. Their titer varied from 1:10 to 1:320. However, it is also evident that the highest titer was reached after the 2nd or the 3rd injection; further immunization not only failed to enhance the titer, but also was unsuccessful in maintaining it. Thereafter the *Proteus* antibodies disappeared rapidly in the blood serum of these animals.

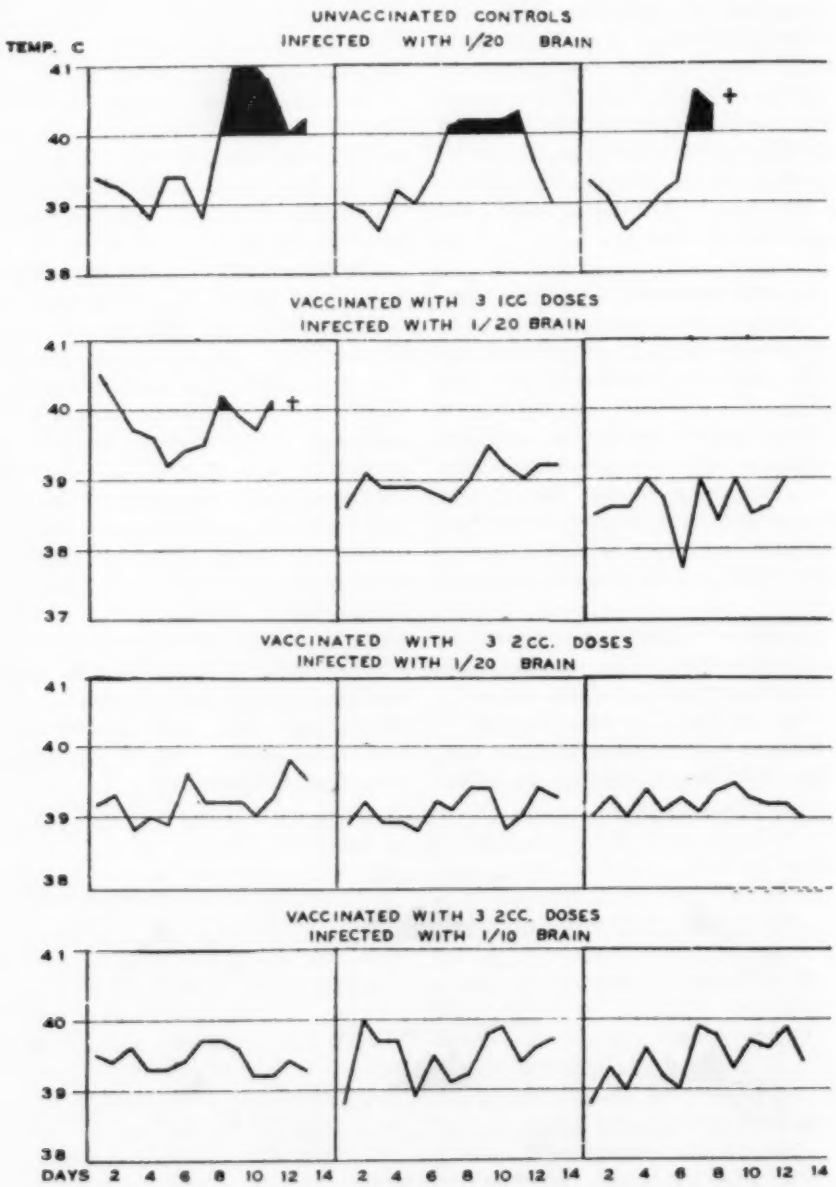
Protection test in guinea pigs—A number of series of guinea pigs was used for this study. Attempt was made to vary the dosage given, and the inoculum used. The method employed follows those generally adopted for studying the protection afforded by vaccine against typhus infection. The vaccine was inoculated subcutaneously, and daily body temperature taken. One week to 10 days after the last injection, an appropriate amount of the inoculum in the form of brain suspension from a passage guinea pig of the homologous type was given intraperitoneally. Daily readings of the body temperature of guinea pigs after such inoculation in one of the several series of animals are presented in Chart 1.

CHART 1—Temperature of control and vaccinated pigs after a large dose of infected material (0.1 of brain)



+ means killed.

CHART 2—Temperature of control and vaccinated pigs after a smaller dose of infected material (0.05 of brain)



+ means killed.

To save space, the temperature after vaccination is not included in the chart, but there was only an occasional animal which showed transient elevation above 40°C. 24 hours after injection, and it never lasted longer than 48 hours. From Chart 1, it is clear that, while 3 doses of 0.5 cc. failed to arouse resist-

ance to the inoculum, 3 1 cc. doses definitely produced some degree of immunity. It is recognized that this protection was not complete, and so a further series with 3 2 cc. doses, and with decreased inoculum has been studied.

It can be seen from Chart 2 that all the controls showed fever following injection of only 1/20 of the brain of a passage guinea pig. After 3 1 cc. doses of vaccine, the guinea pigs were still not completely protected against this reduced inoculum, as one of the 3 showed fever, and positive culture from the *tunica vaginalis*. However, after 3 2 cc. doses of the same vaccine, the guinea pigs were completely protected both against the smaller and against the larger dose of inoculum. This indicates that, given a sufficient amount of vaccine, the animals can be rendered immune to a fairly large dose of typhus rickettsiae.

Reaction of a monkey to vaccination—Before the vaccine was given to human subjects, it was considered of importance to inject at least one monkey in order to find out what local and general reactions the vaccine would cause in an animal of higher order, and to study its serological response. Accordingly, a Macacus monkey was given 3 subcutaneous injections of 1 cc. of vaccine with body temperature taken before inoculation and 24 hours later. It was found that there was only very slight local redness and swelling, and never any fever. One month after the last injection, blood taken for the Weil-Felix reaction showed a titer of 1:40, it being negative before the inoculation. At the same time a small dose of infectious material was injected subcutaneously. Body temperature was then taken daily, and for a period of over 2 weeks; no fever was observed. A guinea pig receiving the same inoculum ran a mild fever indicating that the dose employed was definitely infective for the latter animal. This finding, while far from conclusive, suggests that the animal might have been protected from the dose of typhus material employed. Of greater importance was the fact that the vaccine so prepared was entirely innocuous to the monkey as well as to the smaller laboratory animals, and it seemed safe to use it on human beings.

Immunization of human beings—In view of the absence of any untoward general reaction in the monkey and the

TABLE 1

Subjective and Serological Reaction Following Typhus Vaccination

		Post-vaccinal Reaction		Weil-Felix Reaction			
					After Vaccination		
Name	*Previous Vaccination*	*Local*	*General*	*Before Vaccination*	*1 Month*	*1½ Months*	*2 Months*
S.P.H.	No	—	—	Negative	Negative		
W.H.C.	"	—	—	"		Negative	
Z.S.H.	Yes	+	—	"	1:10		Negative
K.F.Y.	"	—	—	1:80	1:80		
L.P.Y.	No	—	—	Negative	1:20		1:20
T.T.H.	"	—	—	"			1:20
L.S.I.	"	—	—	"	1:40		
C.F.C.	"	—	—	"	1:40		
L.T.P.	"	—	—	"	1:80		
W.L.S.	"	—	—	1:10	1:40		
P.F.H.	"	—	—	1:10	1:40		
C.T.I.	"	—	—	1:10	1:40		
C.C.T.	Yes	—	—	1:10	1:40		
T.T.W.	No	—	—	1:10	1:80		
L.T.H.	"	—	—	1:10		1:80	
C.S.I.	"	—	—	1:20	1:40		
L.C.W.	"	—	—	1:20	1:80		
T.Y.S.	"	—	—	1:20		1:80	
S.H.T.	"	—	—	1:40	1:80		

definite evidence of protection in several series of guinea pigs, a number of adults volunteered to try out the vaccine. A few of these had received typhus vaccine in various forms but the majority had never received previous immunization. In every case blood was taken for the Weil-Felix reaction before inoculation. The first dose employed was 0.5 cc., the second and the third, 1 cc. given subcutaneously at weekly intervals. Special attention was paid to the presence of local and general reaction. One month after the last injection blood serum was obtained from all individuals and the serological test was repeated. These observations on the effect of typhus vaccine on human subjects are presented in Table 1.

From the table, it seems clear that only slight local and practically no significant general reaction followed the use of this vaccine in all of the human volunteers. In most cases a definite rise in the anti-proteus X_{19} antibody titer was observed. In order to confirm this finding, a larger series of human cases was studied. As before, samples of blood were taken before and after the course of vaccination of 2.5 cc. given subcutaneously at weekly intervals. Thirty-eight additional persons were so studied. A definite increase in their Weil-Felix titer was again noted. Among the total of 57 individuals so studied, 6 showed no change, 23 showed a twofold increase, 20, fourfold, and 9, eightfold increase in the Weil-Felix titer.

Single specimens of blood were obtained from about 100 additional persons some time after the completion of the course of vaccination. These results, together with those presented above, have been compared with a previous series in which the vaccine used was prepared according to Weigl's method in Table 2.

DISCUSSION

The practical value of typhus vaccine has been amply demonstrated by a number of workers both in animal experiment and in human prophylaxis. The Weigl method, which has been extensively practised in certain parts of Europe for protection against the classical type of typhus, has recently been used with particular success in North China.[12] The vaccine prepared with a local strain has protected a large number of Americans and Europeans from succumbing to this fatal disease. However, because of technical reasons, it is necessarily difficult to produce the vaccine in large quantities and at a reasonable price. In view of the successful cultivation of typhus rickettsiae on agar-tissue culture media, an attempt was made to prepare vaccine from these

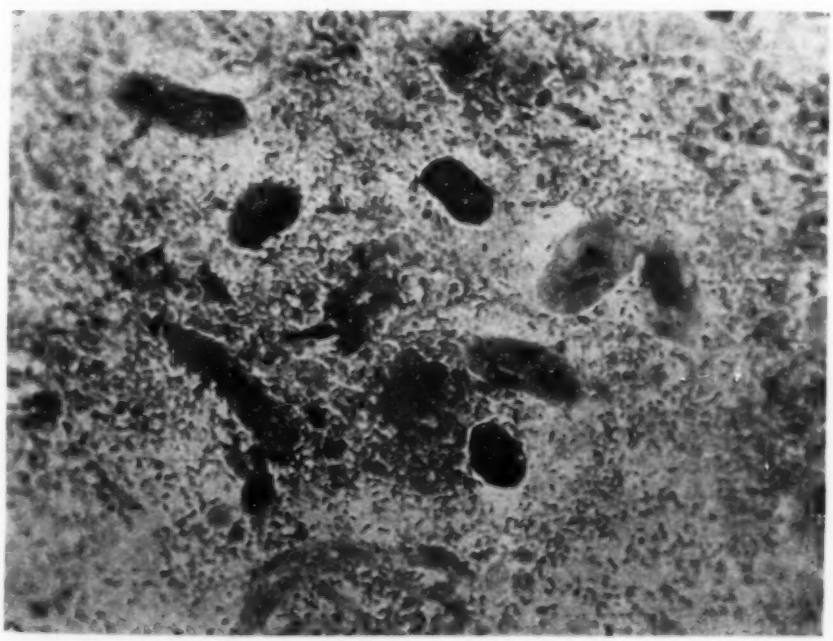
TABLE 2

Comparative Weil-Felix Titer After Two Types of Typhus Vaccine

Titer of Proteus X_{19} Antibody	*Number of Positives in Individuals Vaccinated with*			
	Weigl Vaccine		*Cultural Vaccine*	
	Number	*Per cent*	*Number*	*Per cent*
<1:10	31		7	
1:10	23	42.2	10	26.8
1:20	49		27	
1:40	67		47	
1:80	46		40	
1:160	25	57.6	23	73.2
1:320	2		8	
1:640	0		2	
Total	243		164	

cultures. It was found that the local strains can be easily isolated and cultivated from the *tunica vaginalis* of infected guinea pigs onto these media, and they have been grown on media containing either horse or human serum. From the first generation sub-cultures have been possible on mouse embryonic tissue with which it has now been carried for more than 25 generations. The vaccines prepared from these cultures have produced positive Weil-Felix reactions in rabbits and human beings, and afford definite evidence of protection in guinea pigs against appropriate doses of infectious material in experimental infection. They were found to produce little or no local and general reaction. However, the dose used was entirely empirical, as no method for the standardization of the vaccine has so far been found. The organisms are of such minute size that direct counting is extremely difficult if not impossible. The opacity standard cannot be employed because of the presence of an uncertain quantity of embryonic tissue. The method is still time consuming and not yet entirely suited for mass production.

The success of human prophylaxis by means of this cultured vaccine cannot be determined at present. It is obvious that a serological test, even one which measures the neutralizing capacity of the serum, does not represent the resistance of the individual.[15] The Weil-Felix reaction has been employed because it is simple and easily carried out, and the resulting data can be compared with those obtained from previous experience in which other types of typhus vaccine have been employed. So far it is evident that the cultural vaccine elicited an almost identical serological response to that obtained with vaccine prepared according to Weigl's method. The vaccine is now being used in individuals who are likely to be exposed to typhus infection, such as residents of Peking and



Rickettsia growing on agar tissue culture

its surrounding districts, and the incidence of the disease among these vaccinated individuals will be noted. For the present, therefore, it is impossible to estimate the practical effectiveness of the vaccine until it is proved in field exposures.

SUMMARY

Typhus vaccine prepared by growing a local strain of typhus rickettsia on agar-tissue culture has been studied. After treatment with merthiolate and phenol, it was found to be entirely non-infectious, but capable of producing positive Weil-Felix reactions in rabbits and in men. Furthermore, if given in sufficient amount, it protected several series of guinea pigs completely against subsequent infection.

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CONFERENCE OF MUNICIPAL PUBLIC HEALTH ENGINEERS

ALTHOUGH most municipal health departments were founded and built on sanitation programs, it has again been brought to our attention by the new organization of Municipal Public Health Engineers, meeting at the time of the American Public Health Association convention in Pittsburgh, that only one-fourth of the 211 cities in the United States of above 50,000 population have trained men directing their sanitation programs. When we add to this the fact that the majority of the inspectors in municipal health departments have had no educational training whatever in public health, it is easy to see that many health administrators need to take time out to examine the foundations upon which their programs are built.

The need for engineers to promote and supervise environmental sanitation activities in the state health departments has long been recognized. Fundamentally the educational and training requirements for municipal public health engineers are the same as for state public health engineers. The administrators of municipal health departments must recognize that control of the environment for the protection and promotion of public health involves engineering principles. This will prove of inestimable value in the development of well rounded health programs.

Planning and promotion, inservice training, research and study are all needed in the development of sound programs, but are not possible without qualified direction. An eight point program giving the aims and purposes of the Conference was outlined. The suggested program includes the use of the organization as a medium for the exchange of ideas. It was pointed out that there is an opportunity to exert a greater influence in all matters affecting the municipal public health engineer.

Two resolutions were passed, one directed to the American Public Health Association and the other to the State and Territorial Health Officers, calling attention to the fact that the problems of controlling the environment involve engineering principles.

The fact that the Health Conservation Contest gives little credit for quality of sanitation activities, but relatively more credit for quantity of work done, and permits health departments without sound sanitation programs to win the contest, was alluded to several times in the discussions.

The public health engineering courses now offered in the schools of today were discussed. The municipal public health engineer requires the same foundational courses as the state public health engineer. These courses are available but not always included in the sanitary engineering options or courses offered. There is need for sound advice and assistance on the part of the faculty in working out suitable complete courses. The required preparation cannot be acquired in 4 years of study, but requires 5 or 6 years.

The need for incorporating the public health viewpoint into all matters of planning, including housing, zoning, water supplies, disaster relief, drainage systems, sewerage systems, etc., is evident. Unless this viewpoint is considered, the health department program often becomes a negative correctional code rather than an intelligently planned, positive type of program.

It is felt that there is a place for such an organization as this in the development of the public health program of the country, and it is expected that from this small beginning it will grow to be an influence in the field of municipal public health engineering comparable to the influence that the Conference of State Sanitary Engineers has exerted in its field.

THE FIRST FIFTY YEARS OF THE MASSACHUSETTS PUBLIC HEALTH ASSOCIATION, 1890–1940

ON January 11, 1890, thirty-five men representing the Massachusetts State Board of Health and twenty-four local boards of health, met in Boston and organized the Massachusetts Association of Boards of Health. Dr. Henry P. Walcott,* who served as the distinguished Chairman of the State Board of Health for twenty-five years, was elected the first President, and Dr. Samuel H. Durgin,* the Chairman of the Boston Board of Health, First Vice-President of the Association.

The Golden Anniversary of this pioneer unofficial state health organization, to be held January 27, 1940, has more than local interest. Massachusetts has made many significant contributions to public health administration and science, and has given to the profession many leaders. The establishment of the Boston Board of Health in 1799, of which Paul Revere was Chairman, was one of the first official health organizations. The famous "Report of the Massachusetts Sanitary Commission, 1850," by Lemuel Shattuck, stands as a great landmark in the history of public health in America. The registration of births, marriages, and deaths in 1842, made effective by this same leader, gave this state some of the earliest reliable vital statistics in the United States. The appointment of the Massachusetts Drainage Commission (1886), consisting of such well known men as William T. Sedgwick, Hiram F. Mills, Thomas M. Drown, and Edwin O. Jordan, and their extraordinary contribution to problems of sewage disposal and water purification; the establishment of the first state antitoxin laboratory (1895), with Theobald Smith, Director; the first state tuberculosis hospital authorized (1895); and more recently the official organized attack on cancer, leading to the formation of a division of adult hygiene in the state department (1929); and

* See also page 88 for brief sketch of life and work.

the pneumonia control program (1931), are a few of the outstanding contributions made by this old state. No less than six former, or present members of the Massachusetts Association have been presidents of the American Public Health Association: Walcott, Durgin, Sedgwick, Chapin, Swartz, and Winslow.

The date of organization, 1890, marks an epoch in the history of sanitary science and preventive medicine. It may have been the consciousness of the advent of a new era that drew these men together. The time had come for collective thinking and collective action. Sanitary laws were in need of extension, improvement, and better enforcement.

The decade preceding had seen the fruition of the science of bacteriology. Bacteria had been demonstrated to be the specific cause of a number of the most important epidemic diseases. The first light had been shed upon the nature of diphtheria toxin, followed shortly by the discovery of antitoxin, thus opening up an enormous and new field of preventive medicine. Sanitary bacteriology was becoming a distinct branch of this new science, thanks largely to the work of the Sanitary Commission mentioned. Engineering and medicine were beginning their combined attack on man's age old pestilences.

We may pause briefly to view the benefits as revealed in the vital statistics of Massachusetts.

	1890 [1]	*1938* [2]
Death rate per 1,000 population	19.44	11.2
Birth rate per 1,000 population	25.81	13.8
Tuberculosis death rate per 100.000 population	259.0	38.6
Typhoid death rate per 100,000 population	37.0	0.3
Diphtheria death rate per 100,000 population	73.0	0.5
Cholera Infantum death rate per 100,000 population	111.0	2.8 *

* Diarrhea and enteritis (under 2 years)

Comparisons like the above have become commonplace, and are accepted casually, but they are a measure of the most significant achievements in all human history. Millions now live who would have died in infancy and childhood. The dread of diphtheria has been removed; the pain and suffering of the fever-wracked typhoid patient is rare; the "bloody diarrheas of infancy" are a thing of the past; the wasting "consumption" is in retreat.

"Each important forward step in public health during the past fifty years in Massachusetts has gained impetus through the meetings of the Association." [3] The meetings from the beginning have dealt with live, contemporary problems. Boards of health in the nineties were poorly staffed, and their activities were very limited. It is not difficult to imagine the leadership and inspiration radiated by such men as Charles V. Chapin and William T. Sedgwick, members of the organization in its early history, who frequently made contributions. Sedgwick's championship of clean milk and pasteurization stands out in the records. From the earliest meetings down to the present, diphtheria and its control hold an important place. Chapin's bold stand on fumigation, nuisances, and the importance of contact infection are conspicuous.

In January, 1901, the first issue of the *Journal of the Massachusetts Association of Boards of Health* was published. This daring undertaking by a local organization of less than one hundred members showed not only courage, but faith. They were justified, for this *Journal* was the parent of the present *American Journal of Public Health*.

In 1904 the title was changed to "American Journal of Public Hygiene and Journal of the Massachusetts Association of Boards of Health"; and in 1910 it was "American Journal of Public Hygiene, Official Organ of the Massachusetts Association of Boards of Health and American Public Health Association." The next year, 1911, the name of the Massachusetts Association was no longer on the title page, and it was "The Journal of the American Public Health Association."[3]

In 1933 the Association was reorganized, chiefly to provide for the expanding professional interests in the public health field. A Health Officers' Section, a Laboratory Section, and a Child Hygiene Section were created. In 1936 the name was changed to "Massachusetts Public Health Association," reflecting more correctly its nature, and its broadening activities and interests.

The relationships of this state society with the American Public Health Association have been long and intimate. Although Massachusetts was not the first state association formally to affiliate with the larger body, it may rightly be said that no other state group among the twenty-one now affiliated has had a more vital or a more conspicuous part in the American Public Health Association. Here is proof, if proof were needed, that these state societies may contribute not only to public health in their respective areas, but to the understanding and fellowship between workers in the manifold fields of health service represented in the larger body and to the advancement of that great cause of the public health.

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HENRY PICKERING WALCOTT AND SAMUEL HOLMES DURGIN

THE following sketches of the lives and work of the early leaders of the Massachusetts Association of Boards of Health have been compiled in connection with the fiftieth anniversary of that association's founding by its present President, Professor Curtis M. Hilliard:

"DR. HENRY PICKERING WALCOTT, Sanitary Statesman, leader in public health, for twenty-eight years Chairman of the State Board of Health of Massachusetts"—thus does Dr. George C. Whipple salute Dr. Walcott in his notable book, *State Sanitation.* Dr. Walcott was born at Hopkinton, Mass., December 23, 1838. He was graduated from Harvard College in 1858, and received his medical degree from Bowdoin College in 1861. After extensive travel and study in Europe he began the practice of medicine in Cambridge.

His first public service was with the Cambridge Board of Health of which he was made a member in 1878. In 1880, he was appointed health officer to the State Board of Health, Lunacy, and Charity. When this Board was reorganized in 1886, Dr. Walcott was elected Chairman, and he held that position until the State Department of Public Health was organized in 1914.

Dr. Walcott held many honored and

important positions throughout his life. Among other positions he was a member of the Board of Overseers of Harvard College, Chairman of the Board of Trustees of the Massachusetts General Hospital, President of the Massachusetts Medical Society, and in 1886 was President of the American Public Health Association. He was one of the founders of the Massachusetts Association of Boards of Health and served as President from its inception in 1890 to 1913. In all these positions he gave distinguished and dynamic leadership. As a presiding officer he had a graciousness and dignity that commanded immediate respect.

His active life was spent during those more thrilling and pioneering years of the development of modern sanitation and preventive medicine. He surrounded himself with able leaders, who, under his administration in the manifold fields indicated, advanced the knowledge and application of the principles of bacteriology, sanitary science, and medicine to a degree that made Massachusetts one of the great leaders in these spheres.

SAMUEL HOLMES DURGIN was born in Parsonsfield, Me., in 1839, the youngest of twelve children. He was graduated from Dartmouth College, and received his medical degree from Harvard in 1864. He served as an assistant surgeon in the last year of the Civil War. When he was mustered out he entered practice in the City of Boston. In 1867, he first entered public service for the City of Boston, and in 1873, at the time the health work in the city was reorganized, he assumed the chief administrative duties. In 1877, he was elected Chairman of the Board of Health, a position which he held until his retirement in 1912.

Throughout his public service Dr. Durgin was alert to take advantage of new discoveries and ideas. As early as 1894, he commenced the manufacture of diphtheria antitoxin. In this same year at the height of an outbreak of diphtheria in the City, he inaugurated the first medical inspection of school children which evolved into the modern program of the general medical inspection and health supervision of school children. He was the prime mover in establishing one of the first city bacteriological diagnostic laboratories in Boston in 1898.

In 1890, he was one of the active persons in forming the Massachusetts Association of Boards of Health and served as its First Vice-President for twenty years. In this capacity he acted also as Chairman of the Publication Committee and was thus responsible for the quarterly journal of the Association, which was the forerunner of the present *American Journal of Public Health*.

Dr. Durgin is described as a prodigious worker. Though a leader, still he was always gentle, unselfish, and deliberate. He was always a friendly and congenial companion, helpful and sympathetic with his subordinates but with an iron will to do the right as he saw it.

The Annual Year Book will be a supplement to the February Journal

BOOKS AND REPORTS

District Health Development: Department of Health, City of New York, Building Program as Related to the Master Plan for the City of New York—*By John L. Rice, M.D., Commissioner. New York: Neighborhood Health Development, Inc. New York City Department of Health,* 125 *Worth St.,* 1939. 53 pp. Price, $1.00.

In addition to giving an account of the striking progress of the building program with constructive future plans, and a brief description of district health administration in New York City, this volume indicates the wisdom of systematic planning of health programs coupled with the value of joint participation of a strong, representative advisory and supporting group in effective relationship with the official organization. Even though this development is on a larger scale than has been planned or realized elsewhere, the technic of study, planning, and presentation of data here revealed offers many helpful and stimulating suggestions to public health administrators.

Following a frontispiece in color which gives a composite picture of the building program, a table of contents, and a photograph of health department headquarters completed in 1935, the Commissioner of Health gives a description of health planning for the future, including a description of the functions of different bureaus. A map of the city divided into districts shows the location of 125 departmental services including health center buildings, substations, and child health stations. Then follows a description of district health administration by the bureau director, with discussion of (a) the health and teaching center program, in which the medical schools participate, and (b) the opportunity for citizen coöperaton.

Over one thousand leaders and citizens are now taking an active part in committee work in five of the thirty health center districts. This ever-growing body of citizens, including clergymen, bankers, labor representatives, educators, industrialists, parents, doctors, dentists, teachers, and other public-spirited individuals, is enthusiastically at work with the health officers, supervising nurses, and staff members of the Department of Health. These groups and individuals are interpreting the idea of district health administration to their respective communities, taking an active interest and part in every phase of the local health program, and developing close working relationships with community groups and agencies.

This important phase of the district health plan is being carried on through the Committee on Neighborhood Health Development and other voluntary agencies which are closely allied to the Department in the regional program.

This publication is arranged as a loose-leaf document, is well illustrated with maps, building diagrams, work charts, and photographs, and is an impressive report on a phase of public health administration of growing significance. IRA V. HISCOCK

Medicolegal Phases of Occupational Diseases—*By C. O. Sappington, A.B., M.D., Dr.P.H. Chicago: Industrial Health Book Company,* 1939. 405 pp. Price, $2.75.

The control of occupational diseases involves the industries concerned, the insurance companies who underwrite the risks, the medical profession which treats and sometimes tries to prevent the hazards, and, most of all, it involves the Law.

Each of these important factors, with its many ramifications and interrelationships, is discussed in each of the 4 parts of this book, with the emphasis placed upon the medicolegal aspects rather than upon the purely scientific, medical, or sanitary phases of the problem.

As a concise and authoritative statement, based on the experience of an expert in the field, this book should be of value to persons in different professional categories who are concerned with the medical, administrative, or legal aspects of occupational diseases. The legal section would have been enhanced, however, if an attempt had been made to present authoritative statements of the legal principles applicable to the problem, as indicated by the consensus of judicial opinion. Abstracts of selected court decisions handed down during 1936 and 1937 are given in one chapter, but the reader is left to make his own deductions from them, a strain on both the lay and legal minds.

A number of appendices give useful abstracts of state legislation, schedules of diseases, more abstracts of legal decisions, and suggestions for legislation. The book is well documented, has a comprehensive index, and a table of cases. It is, on the whole, a valuable contribution to the subject, especially for physicians and public health officials. JAMES A. TOBEY

The Field Unit in Local Public Health Service: Tennessee and Mississippi, 1930–37—*By Harry E. Handley. New York: Commonwealth Fund,* 1938. 50 pp. Price, $.25.

Dr. Handley has presented an exceedingly interesting, accurate, and practical description of the way in which consultant service for local health departments is provided through a trained and experienced field staff of medical, nursing, sanitarian, clerical, and other workers. The relationship of these workers to the local health departments is worthy of further emphasis: first, assignments are made only upon request or with approval of the responsible administrative local official—the full-time local health officer or health department director—the local health officer never loses his identity; second, the field staff members are subject to local health department regulations such as work hours, leave, etc., upon arrival at a particular local health department; third, a report of findings and suggestions for improvement of administrative and technical services is made to and discussed with the local health officer and other local staff members as indicated before the field unit worker departs from the area, therefore, the final written report to the local health officer is an expression of group opinion with due consideration being given all local factors; and, fourth, all members of the field unit staff have had successful local field experience and have demonstrated their ability to teach others prior to employment. The need for expert consultant assistance is apparent since few local governments are able to provide highly trained technical assistants on a full-time basis. Many interesting and worth while accomplishments are outlined to illustrate the practical way in which these staffs function.

The author, in drawing from personal field experience and direct contact with these field services over a period of years presents a challenge that all responsible executive officers of state health departments cannot ignore in planning for an improved quality and quantity of public service within their respective states.

W. C. WILLIAMS

Public Water Supplies in Virginia: Descriptions and Chemical Analyses — *Richmond, Va.: Virginia Department of Health,* 1939. 159 pp.

Following a statement of the laws pertaining to the public water supplies in Virginia, this publication sets forth brief but adequate descriptions of all those supplies. Of interest and value also are the results of chemical analyses of many Virginia water supplies. It is significant to note that 40.5 per cent of the population of this state is furnished with artificially purified water for drinking.

ARTHUR P. MILLER

The Story of Surgery—*By Harvey Graham. With a foreword by Oliver St. John Gogarty. New York: Doubleday, Doran,* 1939. 425 pp. Price, $3.75.

The author says of this unusually interesting book that it is a story and not a historical treatise, intended for "ordinary men and women, as distinct from that nebulous and rather awe-inspiring creature the intelligent layman." He thinks that it may perpetuate some mistakes but they are so venerable that only the irreverent would want to see them corrected. Where medical historians disagree on the interpretation of some manuscript he has accepted the one which pleased him most.

The book opens with a thrilling description of the first operation for falling sickness some half million years ago. The surgeon had for knives only flints which had been sharpened by striking together. From this beginning we have the story of surgery with its advances and occasional retreats up to the present day with its marvelous successes. From such a wealth of material it is difficult to select the salient features without seeming to neglect others, and it must never be forgotten that little things have come into the building of the great structure as well as those which have attracted world-wide attention. When the boiling oil and treacle were exhausted and Paré used a simple mixture of yolk of eggs and turpentine on gunshot wounds a great step forward was made.

The author gives us the story of the controversies between the barbers, the surgeons, the barber-surgeons, and the physicians—with the final emergence of the surgeons into their place of deserved recognition when "surgeons became gentlemen."

Interesting as the general story of surgery is, many readers will be more attracted by the personal histories of men who took part in bringing order out of chaos. Even the profession knows too little of the past and we are often tempted to quote Osler: ". . . it is a sign of a dry age when the great men of the past are held in light esteem."

From the long list of those who have faced the light and done good things as well as great things we can only select a few: Ambroise Paré, Guy de Chauliac, Henri de Mondeville, the "Three Englishmen"—John of Gaddesden, John of Arderne and John of Mirfield, William and John Hunter, Astley Cooper, "the best known surgeon in London at a time when London was the greatest surgical center in the world," a distinction which Paris had held under Ambroise Paré for a century, the Bells, Paget, McDowell, Sims, Syme, Simpson, and Lister, of whom it has been said that there are only two periods in the history of surgery—before Lister and after Lister. Harvey enters the picture, for although not a surgeon, his discoveries "have been at the base of every advance in medicine and surgery." Needless to say, Pasteur takes a prominent part in the story, since in spite of the learning and skill of the surgeons, they had about reached the peak of the possibilities of their art prior to two great events,—the discovery of anesthesia and the work of Pasteur, applied by Lister.

The book is filled with human in-

terest and the author has pointed out how little change has taken place in human nature during the long years of which he writes. A chapter devoted to "The Quacks and the Brothers" gives some well known stories and brings out a most unpleasant characteristic of human nature which is always distressing to those who are advancing science. William Read, a tailor who could not read, was knighted for "curing great numbers of seamen and soldiers of blindness," and became Oculist-in-Ordinary to Queen Anne. John Taylor, whose career Dr. Johnson described as a "striking example of how far impudence could carry ignorance" was given a royal appointment by George II, while his grandson became oculist to both Georges III and IV. Johanna Stephens, who in 1736 claimed a cure for stone in the bladder, derived a large income from peers, dukes, bishops, and merchants, and finally sold her famous secret for 5,000 pounds, raised largely by public subscription. Among the subscribers, many of whom were found in Burke's Peerage, was the Bishop of Oxford. Even the noted Sir Robert Walpole, "an otherwise intelligent Prime Minister" consumed in a few years 180 pounds of soap and 1,200 gallons of lime-water prescribed by a quack to cure vesical calculi, which nevertheless proved fatal. Another human trait is exemplified in the quotation from John of Mirfield (1380):

> "When Physick's dearly bought, it doth much healing bring,
> But when 'tis freely given, 'tis ne'er a useful thing."

The Black Death comes in for mention. In the autumn of 1347 the City of Caffa was besieged by the Tartars. The invading army became infected and was practically wiped out of existence by the plague but before the end they catapulted into the city the corpses of men who had died of Black Death, so within a few days the last of the besieged had died as horribly as had the last of the besiegers. This is the first recorded incidence of bacterial warfare, about which we have heard so much, even within the present year.

Spencer once compared scientific men to children walking on the seashore picking up pebbles. Every once in a while one child will pick up a better polished or a brighter stone than the others. Many instances illustrating this occur. Henri de Mondeville (1260–1320) taught that wounds should be washed clean and left alone. He said, "Many more surgeons know how to cause suppuration than how to heal a wound. Keep your needles sharp and clean or they will infect the wound."

The author credits Morton with the introduction of ether anesthesia, though later on he says, "Actually Dr. Long of Athens, in Georgia, was the first man to use ether as an anaesthetic"—1842. He has apparently lost sight of the fact, pointed out repeatedly, that the famous surgeons of Boston who pushed its use were responsible for its prompt adoption.

The last two chapters deserve special mention. "Today and Tomorrow" sums up the story as we know it today. "The Future" is a forecast which the author introduces with an illustration of the danger of prophecy, quoting Lord Moynihan, who said only about 5 years ago, "The craft of surgery has in truth nearly reached its limit in respect both of range and of safety."

The last chapter, "The Future," ends on a note of optimism for everyone except the surgeon. The surgery of old age will persist and there may be tampering with surgery of the new-born, "removing a gene here and implanting another there." However, the students of our internal economy, "our endocrine glands and the autonomic nervous system," will have done even greater things than at present. They will emerge

from their laboratories and tell the surgeons to drop their scalpels. "Surgery is still that science which deals with the failures of medicine or preventive medicine. One day complete success will be recorded by the workers in these two great fields, and at that moment the surgeon must needs say 'Vale!'"

The book has an excellent bibliography, though the author makes no pretense of its being complete and largely on that account says the book is not a historical treatise. There are two good indices, one of names and one of subjects. There are 33 illustrations, all of which are excellent, and many very rare. Altogether, the book is an unusual one, and it is impossible to write about it without becoming enthusiastic.

MAZYCK P. RAVENEL

Swimming Pool Standards—*By Frederick W. Luehring. New York: Barnes,* 1939. 273 pp. Price, $5.00.

The purpose of this volume is to "provide guiding standards" for those "charged with the responsibility for the planning, construction, and administration of swimming pools in *educational* institutions." After a historical treatment of swimming pools—ancient, medieval, and modern—the author discusses laws, rules and regulations pertaining to them today. Twenty criteria for judging standards are then set up followed by detailed discussion of the suggested standards. A bibliography of 267 references is presented and the references well connected to the discussions of standards. ARTHUR P. MILLER

South Italian Folkways in Europe and America—*By Phyllis H. Williams. New Haven, Conn.: Yale University Press (Institute of Human Relations),* 1938. 216 pp. Price, $2.50.

This volume, it is stated, was written for social workers, visiting nurses, and school teachers and physicians who work among people of foreign birth. It gives accurate and sympathetic information concerning the lives and customs of persons now living in this country who migrated from southern Italy. The material is presented in so charming a manner one feels actually transported to one of Italy's picturesque sunny towns. The characteristic atmosphere is brought into the story so well it is easy to imagine oneself going to market or participating in the preparation of a meal—entering sympathetically into the complete daily lives of the people.

The need for such a volume as this has been long realized by the groups for which it was written; such groups need similar volumes describing the manners and customs of the immigrants from several other countries. It is to be hoped that they will be written.

A. P. HITCHENS

Your Community: Its Provision for Health, Education, Safety, Welfare—*By Joanna C. Colcord. New York: Russell Sage Foundation,* 1939. 249 pp. Price, $.85.

This book, which is an outline of what citizens ought to know about their community, had its origin in a pamphlet by Margaret Byington, first published by the Russell Sage Foundation in 1911 entitled "What Social Workers Should Know About Their Own Community." It is designed to enable interested individuals or groups to study their health, education, safety and welfare status or activities in order that they may be better prepared to take an active part in improving these conditions. It does not pretend to be an original plan for a study of a community but brings together the criteria in the various fields and the standards of good practice and good service set by various organizations in these fields.

There are 19 chapters, covering the method of study and use of material; organization and development of the

community; local government; public safety; workers and conditions of employment; housing and city planning; various aspects of health and medical care; education; recreation; religious agencies; public welfare; foreign-born and racial groups; clubs and associations; and agencies for planning and coordination. There is a comprehensive list of agencies interested in this field and a bibliography of references. It is well indexed.

One feels that there would have to be very adequate guidance of the groups using the book in order that the correct interpretation pertinent to the community under study might be made of the data collected. As much of the material is drawn from agencies having a specialized point of view it, in many instances, must lead to the consideration of details of relatively slight importance. This, however, under intelligent guidance should not cause difficulty.

The book is of particular interest to health workers that they may see what criteria and standards have been set up to guide the activities in other fields of community service. W. F. WALKER

Your Health Dramatized: Selected Radio Scripts—*By W. W. Bauer, M.D., and Leslie Edgley of NBC. New York: Dutton,* 1939. 528 pp. Price, $2.25.

For the health officer who has neither the staff nor skill for radio production of professional quality, this volume is a gold mine of accurate and effective programs. Its medical author directs health education for the American Medical Association; its radio author is on the staff of NBC. Produced by NBC, the series won First Award from the Institute of Education by Radio in 1938. Unsolicited audience response shows people listen to the programs.

There is little more reason for a good radio script to die with one production than for a good play to die. Season, circumstance, and special local situations renew timely interest. Communicable diseases, degenerative diseases, positive health, and the need for better health facilities are dealt with in these 32 scripts, thus creating the opportunity for experimenting with short, special-subject series, using local talent.

As in most educational programs, the characters are typed caricatures which make them adaptable to any locality. Sniffling Chester and the music salesman (script 11) give punch to the story of the common cold. Three well-pointed episodes in a 13-minute script (script 19) personalize the problem of water, waste, and sanitation. Bright young Dr. Stewart does a nice job of deflating and educating big, dumb, politically-appointed health officer Petersen (script 9); one can only regret that it is impolitic similarly to dramatize the problem when it is found in reverse form.

A useful introduction describes the possible use of the material in actual broadcast, simulated broadcast, on the stage, and in the classroom. Educators and health officers who are unfamiliar with sources of such ready-made script material should inquire also from the script exchange of the United States Office of Education.

PHILIP S. BROUGHTON

Real Living: A Health Workbook for Boys in Junior High Schools—*By Ross L. Allen, Dr.P.H. New York: Barnes,* 1939. 106 pp. Price, $.50.

This material is in the form of the usual health workbook, covering various phases of personal hygiene such as growth, nutrition, respiration, special senses, recreation, and the like. Each of the 23 sections starts with some informational statements, then gives a bibliography for reading, and is followed by a list of questions of the essay type.

CHARLES H. KEENE

Rehearsal for Safety: A Book of Safety Plays—*By Fanny Venable Cannon. New York: Dutton,* 1939. 132 pp. Price, $1.00.

Safety education has assumed considerable importance in our modern school program. Various devices and activities have been adopted to integrate safety education with the school curriculum. The inculcation of safety habits, like any other habits, depends upon interest aroused, pleasurable outcomes and repetition in favorable situations. This little book of safety plays capitalizes on the child's dramatic interests and makes it possible for him to participate actively in make-believe situations which guide him into awareness of dangers seen and unseen. The material is cast into simple dramatic form and requires very little, if any, scenery. Eight short plays make up the volume together with a list of questions at the end of each play. This book should prove helpful to teachers in the elementary and junior high schools to supplement other phases of their safety program. RICHARD A. BOLT

Epidemiology in Country Practice—*By William Norman Pickles. Baltimore: Williams & Wilkins,* 1939. 110 pp. Price, $2.50.

As Sir William Budd wrote many years ago, " where the question at issue is that of the propagation of disease by human intercourse, rural districts, where the population is thin, and the lines of intercourse are few and always easily traced, offer opportunities for its settlement which are not to be met with in the crowded haunts of large towns." The author has been practising in a rural area about Wensleydale in northern England for twenty-five years. The population is a stable one and " there was hardly a soul, man, woman, or child, of whom I did not, and do not, know even the Christian name."

Through these many years he has accumulated notes and observations upon the manner in which infectious diseases were introduced and spread among his patients. He has now undertaken to bring these together in this small volume. Although his principal contributions are upon the concomitant occurrence of herpes zoster and chicken pox, upon a small local epidemic of Sonne dysentery, upon the incubation period of " epidemic catarrhal jaundice," and upon an outbreak of "epidemic myalgia," he includes scattered observations upon the duration of the periods of incubation and infectivity of common communicable diseases, measles, scarlet fever, whooping cough, and mumps. The book represents the commendable effort of a country practitioner to contribute to the sum total of epidemiological knowledge by reporting his own direct—even though limited—observations. KENNETH F. MAXCY

Alcohol: Its Action on the Human Organism—*By the Alcohol Committee of the* [*British*] *Medical Research Council* (*3rd rev. ed.*). *London: His Majesty's Stationery Office,* 1938. 159 pp. Price, $.30.

The first edition of this well known report was issued in 1918 by an Advisory Committee of the Central Control Board (of Liquor Traffic). There were then 11 distinguished physicians and scientists serving on the committee.

The second edition was published in 1924 under the auspices of the same committee. But it had then become the Alcohol Committee of the Medical Research Council, consisting of 8 of the original members.

The 1938 edition is sponsored by 5 surviving members—Sir Henry H. Dale, Professor M. Greenwood, Sir Edward Mellanby, Dr. C. S. Myers, and Sir Charles S. Sherrington.

There are 11 chapters, including an introduction and a 9 page chapter of

conclusions. The other 9 chapters deal with such subjects as—the mental effects of alcohol, alcohol as a food, the action of alcohol on digestion, the poisonous effects of alcohol, alcohol as a medicine. The point of view of the committee is objective and disinterested. The work is scholarly, and it is written in clear simple English.

The chapters of conclusions summing up the effects, indicates that the main action of alcohol is confined to the nervous system and that alcohol is a narcotic and not a stimulant; it explains when narcotic action may be useful and the limitations to the value of alcohol as a food; it emphasizes that the use of alcohol as an aid to work is physiologically unsound, and sets forth the conditions under which its use may be physiologically permissible.

Finally the committee states that the temperate consumption of alcoholic liquors, in accordance with certain rules the committee has set forth, " may be considered to be physiologically harmless in the case of the large majority of normal adults; this conclusion, it may be added, is fully borne out by the massive experience of mankind in wine-drinking and beer-drinking countries. On the other hand, it is certainly true that alcoholic beverages are in no way necessary for healthy life; that they are harmful or dangerous if the above mentioned precautions are not observed; further, that they may be definitely injurious for children and for most persons of unstable nervous systems, notably for those who have had severe injuries of the head or who have suffered from attacks of mental disorder, or from nervous shock."

REGINALD M. ATWATER

Evaluation of the Industrial Hygiene Problem in the State of Texas —*By George W. Cox, M.D. Austin: State Department of Health,* 1939. 46 pp.

Findings are reported of the survey of a sample of Texas Industry for the purpose of: (1) bringing a program of public health to the adult population, using industrial groups as a point of approach; (2) locating potential health and accident hazards arising out of the nature of the employment; (3) informing personnel as to materials used, products manufactured, by-products, processes involved, environmental surroundings, and general working conditions. The report contains samples of forms used in the survey, extensive tabulations of results illustrated with graphs, together with an effective summary which points out major problems. Industries were classified according to recommendations of the U. S. Public Health Service. Texas was found to have a higher exposure rate than other states in 21 of the 31 materials compared. The study gives a practical basis for future program development.

IRA V. HISCOCK

Annual Report of the Director of the Pan American Sanitary Bureau —*Surgeon General H. S. Cumming (Retired), Fiscal Year 1938–1939.* Washington, D. C.

This report is full of interest. Very little is said about the Tenth Pan American Sanitary Conference held in Bogota in September, 1938, though it was unusually important not only on account of the program, but because of the attendance, and for the first time women delegates were seated. We are promised the early appearance of the transactions.

Among the more important matters discussed are fellowships and internships in the United States for Latin American doctors. While not on a complete working basis, already six Chilean physicians have been appointed to internships in the hospitals of the U. S. Public Health Service. A number of other Latin American physicians have been aided in ob-

taining training in the United States. The Bureau has also assisted Venezuelan authorities in securing in the United States the services of a number of Spanish speaking nurses and is attempting to do the same for at least one other of our Spanish American republics.

Other important pieces of work are the study of nutrition in the tropics and the preparation of a Manual of Water Supplies giving the minimum standards applicable to water for human consumption.

No major epidemics were reported during the year in the Western Hemisphere. Early in 1939 a severe earthquake occurred in Chile. Sufficient physicians were available, but the Bureau gave the services of a sanitary engineer and chlorine for the disinfection of the water supplies.

Of great interest are the reports of the six members of the Field Personnel, four physicians, and two sanitary engineers. The report must be read to be appreciated and it would be well for physicians and sanitarians generally to keep in touch with what is going on in our sister republics to the south, and especially those matters in which we are taking an active part in coöperation with them. MAZÝCK P. RAVENEL

Bacterial Metabolism—*By Marjory Stephenson (2nd ed.). New York: Longmans Green,* 1939. 391 pp. Price, $7.50.

An advanced textbook, markedly improved over the first edition issued as a monograph. Chapter headings are: Introduction, Respiration, Polysaccharides, The Fermentation of Hexoses, The Decomposition of Proteins, The Metabolism of Nucleic Acid, Nutrition and Growth, Nitrogen Fixation, Autotrophic Bacteria, Bacterial Photosynthesis, Enzyme Variation and Adaptation, appendix giving formulae of media, and bibliography and author index.

Bacterial Metabolism is probably the best text in English on the subject. It includes in general a discussion of the more recent developments in the fields discussed; unfortunately that of the fixation of CO_2 by heterotrophic bacteria is omitted. Some difficulty is experienced in using the references since errors have crept in. It is also difficult to understand the author's use of such basic and important terms as respiration and fermentation; the former is defined as "any chemical process, aerobic or anaerobic, by which energy is liberated by the cell." Fermentation apparently is not defined, but the term is used to characterize carbohydrate breakdown (respiration (?) according to definition) hence, a clear understanding of the use of respiration and fermentation is difficult.

In the author's discussion of the fermentation of hexoses, a clever diagram is used to show the operations of the Embden-Meyerhof-Parnas scheme of glycolysis. The accompanying discussion of the rather complex scheme is clear.

Author's style is clear and discussive. The text is recommended.

C. H. WERKMAN

Public Health in South Africa—*By E. H. Cluver, M.D. (2nd ed.). Johannesburg: Central News Agency,* 1939. 342 pp. Price, $4.00.

As Secretary for Public Health, and chief health officer of the Union Department of Public Health, the author has assembled essential data regarding public health problems and control measures in South Africa. The book is primarily intended to meet the requirements for medical and under-graduate public health students, but contains much useful material for workers in the field of public health in South Africa and elsewhere. Photographs and diagrams are helpful supplements.

The book is divided into 30 chapters,

the first group dealing with problems of sanitation of the environment. Consideration is given to geological configuration of the region, and to the climate, stressing the importance of measurement of the cooling power of the atmosphere and its regulation by ventilation technics. Light and sun radiations are briefly treated, followed by a discussion of the water supply—its examination and purification. The science of nutrition is sketched and suggestions as to the causes of the high degree of malnutrition in South Africa are given, with reference to the fourfold problem of wages, dietetic education, subsidized food, and improved farming methods. A description of food poisoning, with illustrations, is followed by the regulations for meat inspection. Milk-borne diseases are mentioned together with methods for their control which appear as yet to be a local community task. Dwelling and housing regulation also seems to be a local problem; criteria are given for house inspection and far sighted town planning including slum elimination methods. The problem of refuse disposal is a real one in a land where sewerage is inadequate, and several pages are devoted to disposal of household wastes and stable manure.

The succeeding 14 chapters are devoted to a discussion of the epidemiological diseases of the region. Each disease is explained, the problem outlined, and preventive measures are discussed. The sections concerning Plague, Typhus, and Schistosomiasis, contain careful analyses of the diseases, with methods for control. Pneumonia, which has a high mortality rate, is only briefly discussed. Smallpox and leprosy, important diseases in South Africa, are more fully discussed, and the text is supplemented by excellent case photographs.

The last five chapters are devoted to public health administration in South Africa. Terms of the public health act of 1919 are elucidated, including provisions for tuberculosis, venereal infection, and smallpox. Other regulatory acts include the Aviation Health Act of 1935, specially designed to prevent the spread of cholera, plague, yellow fever, typhus, and smallpox. The importance of vital statistics based on sufficient observations is stressed. An appendix to this chapter gives the international list of causes of death and a list of undesirable terms used in order to train physicians of the region to follow standard terminology to insure accurate vital statistics. Industrial hygiene in the area is practically limited to gold mining, and the only labor is native. Compensation for disabilities in the opinion of the author, would be too great a burden for the companies, and as yet "miner's phthisis" is the only such liability controlled by legislation. Child labor, hours, and sanitary conditions for working are said to be rigidly controlled. IRA V. HISCOCK

Public Works Engineers' Yearbook, 1939—*Chicago: American Public Works Association,* 1939. 457 pp. Price, $3.50.

This 1939 *Yearbook* of the American Public Works Association follows much the same pattern as the one published in 1938. It contains in Part 1 a review of events and developments in the public works administration and engineering field touching upon such subjects as personnel, planning and programming, streets, roads, sewerage and sewage treatment, water works practice, street cleaning with refuse collection and disposal, traffic control, street lighting, flood control, irrigation and drainage.

Current problems in public works are treated in Part 2 through the publication of the discussions which took place at the last Public Works Congress held in New York City. A complete index serves to make this material more useful. ARTHUR P. MILLER

Real Living: A Health Workbook for Boys in Senior High Schools—*By Ross L. Allen, Dr.P.H. New York: Barnes,* 1939. 68 pp. Price, $.50.

This is Book II of the series, containing material, on the same plan as Book I, on some 13 topics, getting more into the field of communicable diseases, and discusses also preparation for marriage, traffic safety, alcohol and tobacco, and industrial hygiene and safety. With the properly trained teachers to guide, emphasize, and stimulate interest, these could be worth while material for health instruction. CHARLES H. KEENE

BOOKS RECEIVED

PUBLIC HOUSING IN AMERICA. Compiled by M. B. Schnapper. New York: Wilson, 1939. 369 pp. Price, $.90.

THE VITAMINS. A SYMPOSIUM. American Medical Association. Chicago, 1939. 637 pp. Price. $1.50.

GRAPHIC PRESENTATION. By Willard C. Brinton. New York: Brinton Associates, 1939. 512 pp. Price. $5.00.

INDUSTRIAL HEALTH. ASSET OR LIABILITY. By C. O. Sappington. Chicago: Industrial Commentaries, 1939. 224 pp. Price, $3.75.

HEALTH IN HANDCUFFS. By John A. Kingsbury. New York: Modern Age Books, 1939. 210 pp. Price, $.75.

BIOLOGICAL PRODUCTS. By Louis Gershenfeld. New York: Romaine Pierson, 1939. 236 pp. Price, $4.00.

EAT AND REDUCE. By Victor H. Lindlahr. New York: Prentice-Hall, 1939. 194 pp. Price, $2.50.

CHILD MANAGEMENT SERIES. YOUR CHILD AND DIET. By Cyril V. Pink. 141 pp. YOUR CHILD AND HEALTH. By G. M. Cooper. 111 pp. YOUR CHILD AND BEAUTY. By Cherith Howe. 129 pp. New York: Chemical Publishing Co.. 1939. Each $1.50.

A MIRROR FOR SURGEONS. Selected Readings in Surgery. By Sir D'Arcy Power. Boston: Little Brown, 1939. 230 pp. Price, $2.00.

THE WAY LIFE BEGINS. By Bertha C. Cady and Vernon M. Cady. rev. ed. New York: American Social Hygiene Association, 1939. 80 pp. Price, $1.50.

PENNY MARSH. SUPERVISOR OF PUBLIC HEALTH NURSES. By Dorothy Deming. New York: Dodd, Mead, 1939. 303 pp. Price, $2.00.

HIGH SCHOOLS AND SEX EDUCATION. By Benjamin C. Gruenberg and J. L. Kaukonen. Washington: Government Printing Office, 1939. 110 pp. Price, $.35.

MILK AND NUTRITION. Part IV. New Experiments Reported to the Milk Nutrition Committee. Shinfield, England: National Institute for Research in Dairying, 1939. 70 pp. Price, $.75.

FACTS ABOUT NURSING. 1939. By The Nursing Information Bureau of the American Nurses Association. New York: Nursing Information Bureau, 1939. 59 pp. Price, $.25.

THE PHOSPHATASE TEST FOR CONTROL OF EFFICIENCY OF PASTEURIZATION. By H. D. Kay, R. Aschaffenburg and F. K. Neave. Shinfield, England: Imperial Bureau of Dairy Science, 1939. 54 pp. Price, $.75.

HANDBOOK OF PUBLIC HEALTH BACTERIOLOGY AND CHEMISTRY. Department of Public Health, San Francisco. 2d ed. San Francisco: Stacey, 1939. Price, $1.50.

EDUCATIONAL PROGRAMS FOR EXPECTANT PARENTS. Analysis of Replies to a Questionnaire Survey. By Ellen D. Nicely and Ella Geib Greene. Cleveland: Cleveland Child Health Association, 1939. 72 pp. Price, $.50.

MANUAL FOR BOARD MEMBERS. Material assembled by Ella Geib Greene. Edited by Florence LaGanke Harris. Cleveland: Cleveland Child Health Association, 1939. 42 pp. Price, $.50.

PRELIMINARY SURVEY OF INDUSTRIAL HYGIENE PROBLEMS OF INDIANA INDUSTRIES. By The Bureau of Industrial Hygiene. Indianapolis: Indiana State Board of Health, 1939. 162 pp.

ELEMENTS OF SANITATION. By Edward S. Hopkins. New York: Van Nostrand, 1939. 435 pp. Price, $4.00.

FOOD VALUES OF PORTIONS COMMONLY USED. By Anna dePlanter Bowes and Charles F. Church. 2d ed. Philadelphia: Philadelphia Child Health Society, 1939. 31 pp. Price, $1.00.

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH.D.

As the U. S. Grows Older—Here you will find a stimulating discussion of recent trends in the several important causes of death, and their effect upon longevity. The whole paper is packed with facts which cannot even be mentioned here, but if any deserve to be singled out, these do: diphtheria still stands fourth in numerical importance in young children; and tuberculosis is first among adolescents and young adults (15–45). Why should the spirit of (public health) mortals be proud?

ANON. Major Causes of Death, Increase in Life Expectancy, and Population Changes in the United States. Pub. Health Rep. 54, 46:2054 (Nov. 17), 1939.

A. M. A. Platform—Unified federal health agency; allotment of funds based upon need; local responsibility for meeting needs; extension of medical care for the necessitous; utilization of existing medical and treatment services; expansion of public health and medical measures. These are the planks in the newly promulgated stand of the A. M. A.

ANON. The Platform of the American Medical Association. J.A.M.A. 113, 22:1966 (Nov. 25), 1939.

Henry Aldrich vs. Case History—Gorgeously satirical is this depiction of the way a social work publicist would have written Clifford Goldsmith's "What a Life." Any health worker who cannot find a moral in this to influence his own efforts at propagandizing is simply hopeless.

BEYEA, B. Subtle as a Sledgehammer, or the Social Work Touch in Playwriting. Channels (Social Work Publicity Council). 17, 2:21 (Oct.-Nov.), 1939.

Disabling Sickness in Negroes—When the occupations of negro and white males become more nearly alike the excess of disability rates among negroes tends to disappear. The moral of this study seems to be that it is the difference in work and economic status rather than race *per se* that produces the unfavorable health picture for the negro.

BRINTON, H. P. Disabling Morbidity and Mortality among White and Negro Employees in the Slaughter and Meat Packing Industry, 1930–34 Inclusive. Pub. Health Rep. 54, 44:1965 (Nov. 3), 1939.

Conserving Vitamin A—Mineral oil used as a bowel lubricant, it is reasonable to assume, will take up and carry away fat soluble vitamins. If the liquid petrolatum is first saturated with carotene it prevents the oil from removing this essential from the alimentary tract, we now learn. One may hazard the prognostication that we shall soon be enjoying our vitamin plus mineral oil.

CURTIS, A. C., and BALLINGER, R. S. The Prevention of Carotene Absorption by Liquid Petrolatum. J.A.M.A. 113, 20:1785 (Nov. 11), 1939.

Nursing Visit Content—Nursing visit records in two county health units were studied to discover evidences of improved health practices resulting from the visits. It was found that the number of satisfactory conditions that became worse between visits was about equal to the number that improved. The implications are considered and should be read in full: summarization has no place in this note.

DERRYBERRY, M. Nursing Accomplishments

as Revealed by Case Records. Pub. Health Rep. 54, 46:2035 (Nov. 17), 1939.

Chick Embryo or Calf Lymph Virus—Among a group of 36 babies vaccinated with chick embryo vaccine virus, all but two had takes when re-vaccinated 2 to 3 years later, whereas of 34 children vaccinated at birth with calf lymph virus, 25 were still immune when re-vaccinated after the same interval. If this means that immunity from smallpox is not lasting when culture virus is used, it will outweigh the several advantages which this material seems to possess. It is evident that this issue remains to be settled.

DONNALLY, H. H. Smallpox Vaccination of Infants. J.A.M.A. 113, 20:1796 (Nov. 20), 1939.

Charles Darwin, Remover of Trammels—Ridiculing early efforts in child study, one university lecturer ironically prophesied that, some day, institutions of learning would have courses in child psychology. Reading of this devastating disparagement of Darwin's and other studies, one is inclined to wonder how tolerant he may be of new ventures in learning to understand man.

GESELL, A. Charles Darwin and Child Development. Sci. Month. 49, 6:548 (Dec.), 1939.

Pet Aversions in Foods—University students were given a list of foods and asked to check the ones they disliked most. Buttermilk, organ meats, oleomargarine, parsnips, eggplant, turnips, caviar, and shellfish seem to top the list, and the foods that rank high in being disliked are likewise most unfamiliar. Women have more food aversions than men.

HALL, I. S., and HALL, C. S. A Study of Disliked and Unfamiliar Foods. J. Am. Dietet. A. 15, 7:540 (Aug.-Sept.), 1939.

Saliva and Caries—Saliva from the mouths of persons free from dental caries will protect tooth enamel against solution by acids to a greater extent than will the saliva of persons with active decay. Further, a diet low in carbohydrates but high in proteins and 5 per cent vegetables increases the capacity of saliva to neutralize acid.

KARSHAN, M. Factors in Saliva Correlated with Dental Caries, (and) WILLS, J. H., and FORBES, J. C. Dietary Effects Upon the Acid Neutralizing Power of Saliva. J. Dental Res. 18, 5:395 (Oct.), 1939.

Evidence of Wide Distribution of Polio Virus—Virus has frequently been recovered from the stools of frank cases of poliomyelitis, and from patients with minor illnesses associated with the disease. This report extends the findings to healthy contacts, and offers corroborative evidence that the virus may be spread by healthy carriers.

KRAMER, S. D., *et al.* Recovery of the Virus of Poliomyelitis from Stools of Healthy Contacts in an Institutional Outbreak. Pub. Health Rep. 54, 43:1914 (Oct. 27), 1939.

Children vs. Spinach—Youngsters have taste buds on cheeks and in throat that disappear during adolescence. This may explain the child's dislike for foods which he later learns to accept. Pineapple juice of five degrees of sweetness was tried on older boys and girls and men and women. Age and sex influence upon taste are recorded.

LAIRD, D., and BREEN, W. J. Sex and Age Alteration in Taste Preferences. J. Am. Dietet. A. 15, 7:549 (Aug.-Sept.), 1939.

Public Defenses against Propaganda—Close home to all health "experts" will come this dissertation on how to sensitize oneself against name calling, transference technics, the testimonial, card stacking, and band wagon methods that are the stock-in-trade of the propagandist—and in our business, who isn't?

LINDEMAN, E. C. The Ramparts of Truth. National Parent-Teacher. 34, 3:21 (Nov.), 1939.

Inquiry into Acne—On the radio they called it "adolescent skin" when unctious assurances were given that U-know-who's yeast would end those unsightly pimples. Almost as sketchy assumptions have been propounded naming focal infections, allergy, disturbed metabolism, etc., etc., as the cause. Now comes a truly scientific inquiry which can establish no evidence of any relationship between acne and endocrine imbalance even though the appearance of acne is associated with sexual maturation.

LYNCH, F. W. A Clinical Study of Acne in University Students. J.A.M.A. 113, 20: 1792 (Nov. 11), 1939.

Mental Hygiene for the Multitude—Suggesting the possibilities in psychiatric service for the public through state hospitals and social agencies, the method by which the job is carried out in one city is recounted.

WATSON, J. Psychotherapy for the Poor. Ment. Hyg. 23, 4:558 (Oct.), 1939.

Anti-Rabic Vaccination of Dogs—Evidence from many sources is reviewed which leads to the conclusion that 5cc. of non-virulent vaccine given in one dose does not protect the dog against subsequent experimental infection. However, it is hardly to be expected that this will deter enthusiastic officials from continuing to boost routine dog vaccination projects.

WEBSTER, L. T. The Immunizing Potency of Anti-rabic Vaccines. Am. J. Hyg. 30, 3:113 (Nov.), 1939.

School Health Services that Educate—Health workers will be interested in the manner of presentation adopted in this paper which takes the reader on a come-and-see tour through two imaginary school medical services in the Neanderthal School and the Utopian School. It will not be difficult for you to imagine the type of health units you will discover in each.

WILSON, C. C. The Educational Values of School Medical Services. J. Health & Phys. Ed. 10, 9:506 (Nov.), 1939.

Fecundity and TB—What is your pet assumption about the cause of the higher tuberculosis incidence in young women? Is it late hours, scanty clothing, reducing diets, or industrialization? None of these is susceptible of statistical confirmation, but there is a relationship between birth and tuberculosis rates. Among young women the tuberculosis decline slowed up markedly when birth rates rose after the war. If the relationship is significant, then better prenatal hygiene should be helpful in bettering the tuberculosis situation in young adult female groups.

WOLFF, G. The Decline in Tuberculosis Mortality in Specific Age Groups in the United States and the Absence of this Decline in Young Women After the World War. Am. J. Hyg. 30, 3:63 (Nov.), 1939.

ASSOCIATION NEWS

SIXTY-NINTH ANNUAL MEETING
DETROIT, MICH.
October 8–11, 1940
HEADQUARTERS—Book-Cadillac Hotel and Statler Hotel

STANDARD METHODS FOR THE EXAMINATION OF WATER AND SEWAGE

THE eighth edition of *Standard Methods for the Examination of Water and Sewage* appeared in 1936. The first printing of 3,000 copies was issued in June, 1936; the second printing of 3,000 copies issued in March, 1937; and the third printing of 2,000 copies issued in September, 1938. A fourth printing will issue late in 1939.

In a text of this type, errors are made by the editors or the printer as the material is prepared, and such errors are corrected as found and as later printings issue.

The complete record of corrections made in the second and third printings, together with those indicated for correction in the forthcoming fourth printing follows. Each correction is numbered and there follows each number two, three, or four asterisks (*) which indicate the printing in which the correction has become or will become effective.

Reference to the title page of the copy in the possession of any individual will disclose which printing he has. If, for example, he is using the second printing, correction numbers followed by two asterisks (**) have been made in that copy. Corrections marked with four asterisks (****) will not be made until the fourth printing issues late in 1939.

Users of the text should check their copy and enter all corrections. In the interest of all laboratory workers, it is important that any further errors be brought to the attention of the editorial committee.

While all the corrections listed have appeared important to the editorial committee, particular attention is invited to items 27 and 31.

On page 213 of the text, a provision was inadvertently carried forward from earlier editions. Correction 27 indicates that a 24, not 48, hour incubation period should be used with secondary or confirmatory broth tubes. The correction brings this portion of the text in accord with the schematic outline on page 216.

Correction 31 relates to an amendment to R. D. Scott's chromate-dichromate standards for the estimation of residual chlorine. While this method is provisional (not standard), it has been widely used. The substitution of the boric acid-borax buffer eliminates the

white precipitate which formerly developed in the standard tubes and is a definite improvement.

The current tendency toward examination of 100 ml. portions of water accentuates the need for precision in making up broth used for primary or secondary fermentation tests. It is feared that the failure of some workers to obtain concordant results in various 10, 50, and 100 ml. plantings may be due to failure to consider the need for reasonably exact concentrations of the food constituents. Concentrated lactose broth must be prepared so as to obtain a concentration of 0.3–0.5 per cent each of lactose and of peptone in the mixture after the sample has been added to the medium.

Definite plans have not been made for the preparation of a new edition (the ninth) but it will not be issued before 1942.

JOHN F. NORTON,
American Public Health Association
HARRY E. JORDAN,
American Water Works Association

1.** *Page 1.* In paragraph 3, change "Parts III and VI" to read "Parts III and IV."

2.** *Page 20.* In section 1.11—Place quotation marks before and after the words "20 per cent."

3.** *Page 29.* Change 12th line under *2. Procedure* to read "Dissolve the combined sulfides in nitric acid and hydrochloric acid, evaporate to dryness, and redissolve the residue in hydrochloric acid and repeat" . . .

4.** *Page 37.* In *section 1.4,* change final line to read: "1 ml. is equivalent to 0.05 mg. of fluorine."

5.*** *Page 43.* Change 2nd line under *2. Procedure* to read "dilute to the mark and mix thoroughly."

6.** *Page 46.* Change reference in line 2 to read "(Part I, Sec. XVIII, A, 3)."

7.** *Page 53.* Place parentheses about words "whole titer" in last two lines.

8.** *Page 54.* Change the figures "30.504" in the table following the word Bicarbonate to "61.008."

9.** *Page 54.* Place asterisk at the end of first sentence after table and insert footnote--"In routine practice a variation of from 15% in waters of less than 50 p.p.m. residue down to a 2% variation in waters over 1,000 p.p.m. residue may be expected."

10.*** *Page 63.* Change opening part of first paragraph under *2. Procedure* to read "Measure 200 ml. of the sample into a 500 ml. Pyrex Erlenmeyer flask. Place 200 ml. of distilled water in another similar flask. Treat the contents of each flask in the following manner: Boil 15 minutes to expel free carbon dioxide. Add exactly 25 ml. of soda reagent and mix thoroughly. Boil 10 minutes," etc.

11.** *Page 65.* Add an asterisk after the word *made* in the sixth line and insert a footnote—"A blank may be run using the indicator with freshly prepared ammonia free water, titrating to a definite color, and deducting in all routine determinations the amount of acid used with the blank."

12.****Page 70. Transpose the 7th and 8th lines from the bottom of the page.

13.*** *Page 74.* In section 1.1 after the word *oxidized* add "as evidenced by the persistence of a faint pink color."

14.** *Page 75.* In last line of *section 2.2* change "6 N hydrochloric acid" to read "3 N hydrochloric acid."

15.** *Page 86.* In *section 1.3,* change the second sentence to read "To this add 140 g. of C.P. ammonium chloride and 350 ml. of C.P. ammonium hydroxide (sp. gr. 0.90)."

16.*** *Page 87.* In next to last line on page, change "0.9534" to read "0.8534."

17.*** *Page 89.* The drawing should show the water discharge lines leading to the catch basin cut off 1" *above* the top of the basin. This change is made so as indicate equipment from which no back siphonage may occur.

18.*** *Page 92.* Change second line to read "Part II" instead of "Part I."

19.****Page 110. In *section 1.4* the formula for sodium bisulfite should read "$NaHSO_3$."

20.****Page 137. In the 7th line of *section 1.3*, change the words "oxidizing capacity" to read "oxygen consuming capacity."

21.** *Page 140.* In the drawing of the sampler, the edge of the lid should be shown flush with the outside of the sampler, i.e., 6¼" in diameter.

22.** *Page 141.* Change "mg." in the last line to "g."

23.*** *Page 153.* Subheadings in the table should read "Chlorides in the water (parts per million)" and "Dissolved oxygen in parts per million by weight."

24.** *Page 177.* Make figures in third line from bottom of page read "50 and 20 mm."

25.** *Page 203.* Delete "0.05" in line 7 and insert "0.5" to make read "0.5 per cent."

26.** *Page 204.* Make lines 7 and 8 of *section L* read "basic fuchsin (85 to 90 per cent dye content) in water."

27.*** *Page 213.* Change the figure "48" in *sections 2.2 and 2.3* to read "24."

28.** *Page 221.* Change "c.c." at top of table to "ml."

29.*** *Page 225.* Insert in line 2 of *section 1.2* after the word "bottle" the words "in presence of excess of crystals."

30.*** *Page 227.* Change "20" in line six to read "0.05."

31.****Page 233. Delete present *section 1.2*, on page 233, and insert "1.2. Boric acid-borax buffer solution pH 6.5. Refer to page 285 for revised directions for the preparation of this buffer solution."

32.*** *Page 234.* Change lines 1 and 2 of *section 1.1* to read "Dissolve 5.0 g. of potassium dichromate and 20 ml. of concentrated sulfuric acid . . ."

33.** *Page 261.* Substitute in line two of *section F* the word "selective" for "specific."

34.** *Page 264.* In the list of specifications of ingredients, f4 should read "Certified by the Biological Stain Commission (Cert. No. CBg-3 (Coleman and Bell Co., Norwood, Ohio) or equivalent)."

35.** *Page 269.* Change the word "complete" in line 2 to "completed."

36.****Page 285. Following the bibliography, insert the following:

"Chlorine standard—buffer solution (Scott)." (The above line to be center heading) "boric acid-borax buffer solution, pH 6.5.

(a) Dissolve 12.4 g. boric acid (H_3BO_3) in distilled water and make up to 1 liter. This solution is approximately M/5 and has a pH of about 4.6.

(b) Dissolve 3.8 g. borax ($Na_2B_4O_7$) in distilled water and make up to 1 liter. This solution is approximately M/100 and has a pH of about 9.2.

(c) Add a sufficient volume, usually about 80 ml., of (b) to 1 liter of (a) to produce a buffer solution of pH 6.5."

37.** *Page 286.* Change the first sentence under *Option 2* to read "Into clean wet bottles add approximately 0.02 to 0.05 g. of powdered sodium thiosulfate."

DECEASED MEMBERS

Loran E. Orr, M.D., Springfield, Ill., Elected Member 1936

Willard B. Soper, M.D., West Haven, Conn., Elected Member 1927

Fred Wasserman, Ancon, Canal Zone, Elected Member 1936

H. E. Young, M.D., Victoria, B. C., Canada, Elected Member 1916, Elected Fellow 1922, Elected Honorary Fellow 1932

Livingston Farrand, M.D., Brewster, N. Y., Elected Member 1910, Elected Fellow 1922

Allan J. Hruby, M.D., Chicago, Ill., Elected Member 1932

Charles R. Tyler, New York, N. Y., Elected Member 1921

APPLICANTS FOR MEMBERSHIP

The following individuals have applied for membership in the Association. They have requested affiliation with the sections indicated.

Health Officers

William B. Birnkrant, M.D., 14 Fifth Ave., New York, N. Y., Administrative Assistant in Charge of School and Child Hygiene, Dept. of Health

Gilbert M. Clarke, M.D., 8660 Madison Ave., South Gate, Calif., Assistant Communicable Disease Physician, Los Angeles County Health Dept.

John C. Greenfield, M.D., 424 Halcomb Ave., Clairton, Pa., Medical Director, Allegheny County

Robert J. Macdonald, M.D., D.P.H., Peace River Health Unit, Pouce Coupe, B. C., Canada, Director

Roy W. McGee, M.D., 501 Court House, Atlanta, Ga., Commissioner of Health, Fulton County

Marshall W. Meyer, M.D., Vaughn Library Bldg., Ashland, Wisc., Health Officer, 9th Sanitary District

William M. Moir, M.D., Bristol-Washington County Health Dept., Bristol, Va., County Health Officer

Roy V. Morledge, M.D., 311 Hart Albin Bldg., Billings, Mont., Member State Board of Health

Arthur J. Pearse, M.D., 426 Engineers Bldg., Cleveland, Ohio, Health Commissioner, Cuyahoga County Health District

Robert E. Rothermel, M.D., Lee County Health Office, Opelika, Ala., Associate County Health Officer

Harry A. Smith, M.D., City-County Bldg., Wheeling, W. Va., City-County Health Commissioner

Laboratory Section

George D. W. Cameron, M.D., D.P.H., 27 Buena Vista Road, Ottawa, Ont., Canada, Chief, Laboratory of Hygiene, Dept. of Pensions and National Health

Morley S. Lougheed, M.D., Health Dept., City Hall, Winnipeg, Man., Canada, Medical Health Officer

Dr. J. E. Schneider, 530 Orchard Ave., Yeadon, Pa., Director, Sharp and Dohme Laboratories

Herman A. Shelanski, M.A., 609 Porter St., Philadelphia, Pa., Parasitologist, Univ. of Pennsylvania and Philadelphia General Hospital

Andres Soriano, M.D., Apartado 1169, Bogota, Colombia, S. A., Head, Dept. of Serums and Vaccines, National Institute of Health

Keith R. Wright, 203 Western Reserve Bldg., Muncie, Ind., Junior Chemist, Muncie Clinical Laboratory

Vital Statistics Section

Paul M. Densen, D.Sc., Dept. of Preventive Medicine, Vanderbilt Univ., Nashville, Tenn., Instructor

Forrest E. Linder, Ph.D., 4003 5th N., Arlington, Va., Chief, Analysis and Reports Section, U. S. Bureau of the Census

Engineering Section

Franz P. Dengler, Ph.D., LL.B., R. 4, Box 352. Muskegon, Mich., Sanitary Engineer, Muskegon County Health Unit

Robert C. Hanlon, M.S., Room 14, City Hall, Des Moines, Iowa, Public Health Engineer, Polk County Health Unit

William I. Jefferies, 4 Rosemont Ave., Alexandria, Va., Sanitary Engineer, Alexandria Health Dept.

Henry H. Matthieson, 156 N. Mariposa Ave., Los Angeles, Calif., Sanitary Engineer, City Health Dept.

Walter A. Norby, B.S., City Hall, Winona, Minn., Collaborating Public Health Engineer, Dept of Health

Walter M. Scott, B.S., 145 S. 3rd Ave., Mount Vernon, N. Y., Sanitary Engineer, Westchester County Health Dept.

Industrial Hygiene Section

Edward C. J. Urban, M.S., Industrial Hygiene Office, Barre City Hospital, Barre, Vt., Industrial Hygiene Engineer, State Health Dept.

Food and Nutrition Section

Elizabeth S. Avery, M.A., 398 Marlborough St., Boston, Mass., Graduate Student in Health Education, Massachusetts Institute of Technology

Ruth C. Clouse. Ph.D., 5643 Blackstone Ave., Chicago Ill., Consultant in Nutrition, Council on Foods, American Medical Association

Elizabeth A. Dickinson, M.S., 111 North Canal St., Chicago, Ill., Assistant to Director of Nutrition Service, National Dairy Council

William A. O'Brien, A.B., 885 Main St., Hartford, Conn., Restaurant Operator

Maternal and Child Health Section

Lyman C. Duryea, M.D., 140 Cabrini Blvd., New York, N. Y., Director, Commission for the Study of Crippled Children

Linwood G. Grace, D.D.S., Dental Division, State Dept. of Health, Harrisburg, Pa., Chief

S. S. Lifson, B.S., 1226 31st Ave., Astoria, N. Y., Research Assistant, School Health Study

Virginia F. South, M.D., 107 Dwight St., New Haven, Conn., Student, Yale School of Public Health

Louis Spekter, M.D., 22 Seyms St., Hartford, Conn., Chief, Division of Crippled Children, State Dept. of Health

L. C. Newton Wayland, M.D., Santa Barbara County Health Dept., Santa Barbara, Calif., Director, Maternal and Child Hygiene

Public Health Nursing Section

Fannie M. Brooks, R.N., B.A., University of Illinois, Urbana, Ill., Assistant Professor of Home Economics

Vera J. Brown, 820 W. Locust St., Wilmington, Ohio, Nurse, Clinton County Board of Health

Anna C. Cardozo, R.N., 129 South New Hampshire Ave., Los Angeles, Calif., Assistant Chief Nurse, Board of Education

Clara G. Christie, R.N., 20 Lincoln St., New Britain, Conn., Maternity & Child Health Supervisor, Visiting Nurse Assn.

Mary M. Dunlap, M.A., 5748 Stony Island Ave., Chicago, Ill., Instructor in Public Health Nursing, University of Chicago

Lucy H. Gregory, 21 Beechwood Ave., New Rochelle, N. Y., Student, New York University

Lois K. Harper, Hamilton County Health Dept., Chattanooga, Tenn., Public Health Nursing Supervisor

Theresa H. Jenniges, B.S., 2036 Fifth Ave., S., Maywood, Ill., Teaching Supervisor, Maywood Health Center

Katherine E. Payne, B.S., R.N., State Dept. of Health, Albany, N. Y., Assistant Educational Supervisor

Lois Stearns, R.N., Middlebury Inn, Middlebury, Vt., Supervisor of Public Health Nurses, Maternal & Child Health Division, State Health Dept.

Grace F. Wilson, 4852 Oakwood Ave., Los Angeles, Calif., Field Supervisor, Health Service Section, Board of Education

Public Health Education Section

Albert W. Dent, A.B., Flint-Goodridge Hospital, New Orleans, La., Superintendent

Leona de Mare East, B.A., 317 S. State Street, Springfield, Ill., Radio Speaker, State Dept. of Public Health

William Feinbloom, Ph.D., 535 5th Ave., Room 706, New York, N. Y., Director, Public Health Bureau, American Optometric Association

Raymond U. Hilleman, M.A., 1575 Neil Ave., Columbus, Ohio, Health Educator, Ohio Public Health Association

Joseph Hirsh, B.S., A.M., U. S. Public Health Service, Washington, D. C., Health Education Specialist, Division of Sanitary Reports and Statistics

John F. Kendrick, M.D., Dr.P.H., State Board of Health, Raleigh, N. C., Member Field Staff, Rockefeller Foundation

Gerald M. Lacerre, Ph.G., 177 W. 102nd St., New York, N. Y., Health Inspector, New York World's Fair

Alice H. Miller, B.S., C.P.H., 6120 S. Greenwood St., Chicago, Ill., Director of Health Education, Tuberculosis Institute of Chicago and Cook County

Elizabeth D. Peck, B. S., 27 Maple St., Greenfield, Mass., Physical Director and Teacher of Hygiene, North East Junior High School

Robert B. T. Schmuck, B.A., 2139 R. St., N.W., Washington, D. C., Technical Assistant, Division of Sanitary Reports and Statistics, U. S. Public Health Service

M. Luther Smith, M.D., Alcorn College, Alcorn, Miss., Director of Student Health and Professor of Health Education

Epidemiology Section

Alfred L. Burgdorf, B.S., C.P.H., Duncaster Road, Bloomfield, Conn., Epidemiologist, State Dept. of Health

Arthur P. Locke, Ph.D., West Penn Hospital, Pittsburgh, Pa., Research Biochemist

Alberto Recio-Forns, M.D., 1117 Carlos 3, Havana, Cuba, Epidemiologist, Instituto Tecnico de Salubridad

Unaffiliated

Dr. Nicanor Almarza, Isabel la Catolica, 13, 4°, Mexico, D. F.

George L. Gately, M.D., 624 Bennington St., East Boston, Mass.

India G. Johnson, A.B., 663 Whitney Ave., New Haven, Conn., Student, Dept. of Public Health, Yale Univ. School of Medicine

Austin L. Joyner, M.D., Lederle Laboratories Inc., Pearl River, N. Y., Director of Research in Biologicals

Charles G. Marshall, P. O. Box 552, Sparta, N. J., Manager, Special Markets Division, Alba Pharmaceutical Co.

EMPLOYMENT SERVICE

The Employment Service will register persons qualified in the public health field without charge.

Replies to these advertisements, when keyed, should be addressed to the American Public Health Association, 50 West 50th Street, New York, N. Y., identifying clearly the key number on the envelope.

Positions Available

Young, energetic, well trained public health nurses needed in Montana for rural areas. Salary $135 per month, plus travel. Write Supervisor of Public Health Nursing, Montana State Board of Health, Helena, Montana.

Positions Wanted

ADMINISTRATIVE

Physician, M.D., class A medical school; M.S.P.H., University of Michigan, 1937; experienced district state health officer, seeks city or city-county administrative position. **A367**

Physician, M.P.H., Harvard; well experienced in city and rural health administration, will consider appointment as district health officer or in city or state health department. **A418**

Physician, M.D., McGill; C.P.H., Johns Hopkins; excellent background of communicable disease control and school health service, seeks position as epidemiologist or public health administrator. **A368**

Physician, M.D., Univ. of Cincinnati; with postgraduate training in venereal disease control, Johns Hopkins; is available as venereal disease control officer. **A363**

Well qualified physician, M.D., Rush; M.S.P.H., Univ. of Michigan; with 3 years' residence in tuberculosis, and special interest in venereal disease control, seeks responsible appointment. Excellent references. **A406**

Well qualified physician, with M.P.H. from Johns Hopkins, experienced as county health officer and now assistant health officer in a large city, will consider county or city administrative position. **A383**

HEALTH EDUCATION

Young woman, experienced teacher in health education, with M.S. in Public Health and Hygiene from University of Michigan, seeks position as health coördinator. **H398**

Young woman, M.A., Health Education, Teachers College, Columbia; with splendid international experience, seeks position as director of health education. **H369**

Well qualified woman in health education wishes position as health coördinator or health counselor. Has wide experience, and Ph.D. from New York University. **H236**

LABORATORY

Experienced teacher in biochemistry and bacteriology; Ph.D., Iowa; now laboratory director in midwestern state; will consider teaching, executive or administrative position. **L440**

Experienced teacher in bacteriology and public health; Ph.D., Cornell; now professor in grade A medical school, will consider teaching, executive or administrative position. **M437**

Young man bacteriologist, with training in serology; for the past 4 years bacteriologist in charge, public health laboratory; will consider opening. **L427**

Young man bacteriologist, M.S., Cornell; Ph.D., Rutgers; experienced in bacteriology, water supply, sewage, dairy and general public health laboratory work, extensive research in bacteriology and sanitary chemistry, high federal and state civil service ranking as bacteriologist, now employed as bacteriologist in eastern hospital; seeks responsible position in laboratory work or teaching of bacteriology, dairy industry or sanitary chemistry. **L439**

MISCELLANEOUS

Physician, M.D., class A medical school; training in obstetrics and public health; experienced as director of county health department, teacher of clinical obstetrics and administrator of state maternal and child health program, desires position in public health obstetrics or in

maternal and child health administration. **C417**

Experienced director of milk control, food and sanitation and industrial hygiene, seeks position. B.S. degree and well known record directing such work in 2 major cities and 1 state. References prominent public health personalities. **I434**

Young woman statistician, B.S. in Education, Univ. of Pennsylvania; M.S.P.H., Univ. of Michigan; experienced as secretarial, research and statistical worker in school of public health, desires position in the public health field. **S431**

Physician with M.P.H. from Johns Hopkins and experienced in teaching will consider student health service position, teaching responsibility or a combination. **A445**

Advertisement

Positions Open

ASSISTANT HEALTH OFFICER—And director child hygiene; excellent opportunity for young physician interested public health work; some background of training in pediatrics and communicable diseases required; California. PH-10, Medical Bureau, Palmolive Building, Chicago.

COUNTY HEALTH OFFICER—Young physician with year's acceptable course public health at university, some general practice experience; $2,700, travelling expenses; central state. PH-11, Medical Bureau, Palmolive Building, Chicago.

STUDENT HEALTH PHYSICIAN—For staff of state college; five full-time physicians in department; $200; 9-month year; west central state. PH-12, Medical Bureau, Palmolive Building, Chicago.

COUNTY PHYSICIAN—Opportunity to build own private practice in county of 1,200 population; small assured stipend for light duties as county health physician; Idaho. PH-13, Medical Bureau, Palmolive Building, Chicago.

COUNTY HEALTH PHYSICIAN—Young gentile physician, interested public health work; training provided; southerners under 35 preferred; beginning stipend vicinity $225. PH-14, Medical Bureau, Palmolive Building, Chicago.

PUBLIC HEALTH NURSE—Must be excellently trained in orthopedics; $200; South. PH-15, Medical Bureau, Palmolive Building, Chicago.

PUBLIC HEALTH NURSE—For school district with corps of five nurses having public health degree; school district averages 1,600–1,700 pupils; $125, car maintenance or carfare; city of 80,000; midsouth. PH-16, Medical Bureau, Palmolive Building, Chicago.

BACTERIOLOGIST—Preference for one with public health laboratory experience; state laboratories; South. PH-17, Medical Bureau, Palmolive Building, Chicago.

Situations Wanted

PUBLIC HEALTH PHYSICIAN—B.S., M.D. degrees, eastern schools; C.P.H., Johns Hopkins School of Hygiene; 5 years chief epidemiologist State Department of Health; for further information, please write Burneice Larson, Director, Medical Bureau, Palmolive Building, Chicago.

BACTERIOLOGIST—B.S., M.A., and Ph.D. degrees, state university; 10 years, teaching and research, including instructorship state laboratory of hygiene; would like research appointment in public health laboratory, or university teaching connection affording unusual research opportunities; for further information, please write Burneice Larson, Director, Medical Bureau, Palmolive Building, Chicago.

PUBLIC HEALTH NURSE—Teacher's certificate from state teacher's college; graduate training in public health nursing, University of Minnesota; 6 years, public health nurse; 3 years, chief supervising nurse, division of child hygiene; for further information, please write Burneice Larson, Director, Medical Bureau, Palmolive Building, Chicago.

HEALTH EDUCATOR—Graduate nurse and B.S. degrees; social service certificate; 3 years' experience in social service; 4 years, industrial nursing; 10 years, director of health council; for further details, please write Burneice Larson, Director, Medical Bureau, Palmolive Building, Chicago.

NEWS FROM THE FIELD

AMERICAN SCIENTIFIC CONGRESS

THE Honorable Cordell Hull, Secretary of State of the United States, has announced that the Eighth American Scientific Congress will be held in Washington, D. C., from May 10 to 18, 1940, under the auspices of the Government of the United States of America. Invitations on behalf of the President of the United States have been extended to the governments of the American Republics members of the Pan American Union to participate in the forthcoming meeting. Scientific institutions and organizations are also cordially invited to send representatives to this Congress which will celebrate the fiftieth anniversary of the founding of the Pan American Union.

Serving as representatives on the Organizing Committee collaborating with the Department of State in formulating definite plans for the Congress are some fifteen distinguished Americans, among whom Dr. Thomas Parran, Surgeon General of the U. S. Public Health Service, represents the fifth section on Public Health and Medicine.

HEALTH COÖRDINATION

AN interesting report on "The Status of Health Coördination in Large Community Chest Cities" has been prepared by Bleecker Marquette, Executive Secretary, Public Health Federation, Cincinnati, Ohio, summarizing questions put recently to community chest directors in cities of 50,000 population or more.

One hundred and twenty-five cities supplied information. Of these, 67 are endeavoring to coördinate health work in the community through a council, committee, or division of some type. Nearly all provide for medical, dental, nursing, and public and private agency representation. Though nearly all are engaged in some form of health education, there are few special committees on health education. Major objectives include study and discussion of health problems, formulating programs, and improving the quantity and quality of health service.

How policies are determined, the sources of funds, executive service available, and activities were brought out by the questions submitted and the resulting data are given in Mr. Marquette's summary. The memorandum ends with a page setting forth the definitions of an approved Health Council and a potential Health Council as agreed upon by the National Committee of Health Council Executives. Copies may be obtained by writing Mr. Marquette at 312 West Ninth Street, Cincinnati, Ohio.

PROPOSED ORGANIZATION OF THE GULF AND CARIBBEAN PUBLIC HEALTH ASSOCIATION

AFTER discussions which have extended over several months among those specially interested, it was proposed at a conference held in Jacksonville, Fla., during the December meeting of the Florida Public Health Association, that the Gulf and Caribbean Public Health Association should be organized as a voluntary health association, which, it is hoped, will eventually be composed of individuals from all of the state, colonial, and national public health associations in territories adjacent to the Gulf of Mexico and the Caribbean Sea, together with representation from the Pan-American Sanitary Bureau.

For the present it is proposed that the organization be closely related to the state and national public health associations in this area, and each such group is requested to designate a representative to a planning committee which will lay definitive plans in the near

future. At a preliminary meeting of the Planning Committee held in Jacksonville the outline of the Constitution and By-laws was discussed, as well as the relationships of such a voluntary group to official health agencies in this territory, and the relationships with the American Public Health Association. Tentatively it is proposed that the Planning Committee will call a convention at some time to be determined in either Havana or Miami or both for the first session. Contact has already been established with the Public Health Association of Cuba, the Florida Public Health Association, the Mississippi Public Health Association, a newly organized group in Mexico City, and a proposed organization in Puerto Rico. Representatives from Cuba, Mexico, Venezuela, and the United States were present at the Jacksonville session.

AMERICAN MEDICAL ASSOCIATION PLATFORM

THE Board of Trustees of the American Medical Association has set up a platform indicating the trend which the A.M.A. believes should be followed in the development of health activities and medical care for the people of the United States.

The American Medical Association advocates:

1. The establishment of an agency of the federal government under which shall be coordinated and administered all medical and health functions of the federal government, exclusive of those of the Army and Navy.
2. The allotment of such funds as the Congress may make available to any state in actual need, for the prevention of disease, the promotion of health and the care of the sick on proof of such need.
3. The principle that the care of the public health and the provision of medical service to the sick is primarily a local responsibility.
4. The development of a mechanism for meeting the needs of expansion of preventive medical services with local determination of needs and local control of administration.
5. The extension of medical care for the indigent and the medically indigent with local determination of needs and local control of administration.
6. In the extension of medical services to all the people, the utmost utilization of qualified medical and hospital facilities already established.
7. The continued development of the private practice of medicine, subject to such changes as may be necessary to maintain the quality of medical services and to increase their availability.
8. Expansion of public health and medical services consistent with the American system of democracy.

MASSACHUSETTS PUBLIC HEALTH ASSOCIATION CELEBRATES GOLDEN ANNIVERSARY

THE Fiftieth Anniversary meeting of the Massachusetts Public Health Association will be held on January 27, 7:00 P.M., at the Parker House, Boston, Mass.

Professor C.-E. A. Winslow, of the Yale School of Medicine, New Haven, Conn., will speak on "A Half Century of Public Health."

ORDER OF CARLOS J. FINLAY

THE President of the Republic of Cuba has awarded decorations of the Order of Carlos J. Finlay to several public health workers from the United States and Mexico. The recipients, who were decorated at a recent meeting of the Florida Public Health Association at Jacksonville by Dr. Domingo F. Ramos, Director of Public Health in Cuba and Minister of National Defense, included Dr. Angel de la Garza Brito, Dean of the School of Hygiene, Mexico City; Dr. G. T. Dunnahoo, Past Assistant Surgeon of the U. S. Public Health Service, Miami; Dr. George MacDonnell, City Health Officer, Miami, Fla., each of whom received the Officer's medal, and Dr. Reginald M. Atwater, Executive Secretary of the American Public Health Association, New York, who received the Commander's medal.

SOUTHERN BRANCH A.P.H.A.

THE 8th Annual Meeting of the Southern Branch of the Association was held in Memphis, Tenn., November 21 and 22 in connection with the meeting of the Southern Medical Association. The sessions were well attended and a diversified program well received.

The new officers elected are:

President: J. N. Baker, M.D., Montgomery, Ala.
1st Vice-President: W. B. Grayson, M.D., Little Rock, Ark.
2nd Vice-President: V. M. Ehlers, Austin, Tex.
3rd Vice-President: Miss Donna Pearce, New Orleans, La.
Secretary-Treasurer: P. E. Blackerby, M.D., Louisville, Ky.

NEW MEXICO PUBLIC HEALTH ASSOCIATION

THE Fourteenth Annual Meeting of the New Mexico Public Health Association was held in Santa Fe, October 25–28, with an attendance of almost one hundred. This was the first meeting since the three sections—Health Officers, Sanitarians, and Public Health Nurses—were organized.

The following new officers were elected:

President—John C. Mitchell, M.D., Silver City
President-elect—R. P. Kandle. M.D., Clovis
Vice-President—M. Easter Flynn, Albuquerque
Secretary-Treasurer—F. W. Parker. Jr., M.D., Santa Fe
Representative to the Western Branch, A.P.H.A.—C. W. Gerber, M.D., Las Cruces
Representative to A.P.H.A. Governing Council—Myrtle Greenfield. Santa Fe

Out-of-state speakers included: Dr. Ethel Dunham, U. S. Children's Bureau; Dr. P. W. Covington, Rockefeller Foundation; Dr. T. D. Martin, National Education Association; A. L. Dopmeyer, U. S. Public Health Service; and Wendell Vincent, U. S. Food and Drug Administration.

FLORIDA PUBLIC HEALTH ASSOCIATION

AMONG those from outside the United States in attendance at the Eleventh Annual Meeting of the Florida Public Health Association, held in Jacksonville in December, were:

Cuba—

Dr. Domingo F. Ramos, Secretary of the National Defense and Director of Public Health
Dr. Guillermo Lage, Director of National School of Sanitation
Dr. Alberto Recio, Epidemiologist, Finlay Institute
Dr. Pedro Domingo, Bacteriologist, Finlay Institute
Dr. Pedro Kouri, Parasitologist, University of Havana
Dr. G. Agramonte, Captain, Cuban Navy
Dr. Toofilo Vega, Captain, National Police
Dr. Nilo C. Pintado, Cuban Quarantine Service, Miami
Dr. Carlos Martin, Secretary, Cuban Delegation, Havana

Mexico—

Dr. Angel de la Garza Brito, Director, School of Health and Hygiene, Mexico City

Venezuela—

Dr. Arnoldo Gabaldon, Chief Malariologist, Caracas

PENNSYLVANIA PUBLIC HEALTH ASSOCIATION

THE Pennsylvania Public Health Association held its 1939 Annual Meeting in Pittsburgh on October 18, during the American Public Health Association annual meeting. The sessions consisted of a business meeting; a dinner session with the Tri-State Food and Health Officials Association, at which Dr. John J. Shaw, the State Secretary of Health, spoke on Future Health Plans for Pennsylvania, and Dr. Arthur T. McCormack on The Philosophy of Health; and an evening session at which the principal speaker was the Honorable Fiorello H. La Guardia, the Mayor of the City of New York, who spoke of the health prob-

lems of that city and how his plans are working out in their solution.

Dr. Henry F. Vaughan presented a paper on Public Health at the Crossroads, and Dr. Edward S. Godfrey, Jr., gave recognition to two Pennsylvanians, Dr. Henry T. Price and Dr. Glenn C. King, in his talk on Recognition of Meritorious Achievements Made in the Field of Public Health.

WEST VIRGINIA PUBLIC HEALTH ASSOCIATION

THE 1939 Annual Meeting of the West Virginia Public Heatlh Association was held in Fairmont from November 6 to 8, with a registration of 151.

Included among the many interesting papers presented at this meeting were the following contributions of some of the out-of-state speakers:

What to Put into a Public Health Program—Dr. Joseph W. Mountin, U. S. Public Health Service

Why You and Uncle Sam Should Be Interested in Food—Marjorie M. Heseltine, U. S. Children's Bureau

Democracy in the Every Day Administration of Public Health—Dr. Halbert L. Dunn, Bureau of the Census

Making the Most Effective Use of Community Facilities—Dr. Carl E. Buck, American Public Health Association

Should a Democracy Be Concerned with the Mental Health of Its Citizens?—Dr. Karl Menninger, Menninger Clinic

Whose Child Is This?—Dr. Edwin F. Daily, U. S. Children's Bureau

How Federal and State Governments May Aid in Safeguarding a Milk Supply—Leonard Male, U. S. Public Health Service

The Accomplishments of the Public Works Program in the Public Health Field—Alfred F. Beiter, Public Works Administration

The following officers were elected to assume office on January 1, 1940:

President—Dr. W. H. Riheldaffer, Romney
First Vice-President—Sarah Switzer, Logan
Second Vice-President—James McKeever, Wheeling
Secretary-Treasurer—Dorothea Campbell, Charleston

COLORADO PUBLIC HEALTH ASSOCIATION

AT its recent Annual Meeting in Colorado Springs, the Colorado Public Health Association elected the following officers to serve for the ensuing year:

President—Roy L. Cleere, M.D.
Vice-President—F. A. Forney, M.D.
Secretary—Helen Cannon
Treasurer—Omer Gillett, M.D.
Representative to A.P.H.A. Governing Council—Amos L. Beaghler, M.D.

CONNECTICUT PUBLIC HEALTH AND CLINICAL LABORATORY ASSOCIATION

AT a meeting of the Connecticut Public Health and Clinical Laboratory Association, held in New Haven on November 24, the following officers were elected:

President—Paul D. Rosahn, M.D.
Vice-President—Anne Koffinke
Secretary-Treasurer—Earle K. Borman
Councillors—L. D. Larimore, M.D., and Jessie W. Fisher, M.D.

NATIONAL CANNERS ASSOCIATION AWARD

ON November 20, 1939, the National Canners Association announced its first award for the work on botulism and food poisoning begun in November, 1919. Four persons were cited.

Dr. J. C. Geiger, Director of Public Health of the City and County of San Francisco

Dr. Karl F. Meyer, Professor of Bacteriology, University of California, San Francisco, Calif.

The citation was made to two who have died since the work was begun:

Dr. W. D. Bigelow, Washington, D. C.

Dr. Ernest C. Dickson, Stanford University, Calif.

—and reads as follows:

"For signal service to the canning industry and to the public health in the discovery of methods leading to the prevention of botulism and in the development of the canning technique relative thereto."

NEW JERSEY HEALTH AND SANITARY ASSOCIATION

AT their Sixty-fifth Annual Meeting held in Asbury Park, N. J., November 17–18, the New Jersey Health and Sanitary Association elected officers as follows:

President—L. D. Bristol, M.D., Montclair
1st Vice-President—L. Van D. Chandler, Hackensack
2nd Vice-President—Joseph E. Raycroft, M.D., Princeton
3rd Vice-President—H. F. Kilander, Ph.D., East Orange
Secretary—Edward Guion, M.D., Northfield
Treasurer—Budd H. Obert, Asbury Park

Nearly 400 persons registered, it is stated, which is by far the largest attendance on record.

MEMORIAL MEETING FOR DR. PARK

A MEMORIAL meeting for the late Dr. William Hallock Park, of New York, N. Y., was held at the New York Academy of Medicine on November 28, under the sponsorship of the faculty of New York University College of Medicine. Among the speakers were Chancellor Harry Woodburn Chase, Dr. Malcolm Goodridge, Dr. Anna W. Williams, Dr. Augustus B. Wadsworth, and the Honorable Fiorella H. La Guardia, Mayor of the City of New York.

CUTTER LECTURES

THE Executive Director of the National Advisory Cancer Council of the U. S. Public Health Service, Dr. Ludwig Hektoen, will give the first of a series of two annual Cutter Lectures in Preventive Medicine at the Harvard Medical School on January 15, 1940. He will talk on the general subject of cancer control with special reference to its public health and epidemiologic aspects. The second Cutter Lecture will be given by Dr. James B. Murphy, member of the Rockefeller Institute for Medical Research, January 22, 1940. Dr. Murphy will give a critical review of experimental studies in cancer. The Cutter Lectures have been given each year since 1912. The medical profession, medical and public health students, and others interested are invited to attend. These lectures will be held at 5 P.M., in Amphitheatre E at the Harvard Medical School.

PERSONALS

Eastern States

PAUL D. BROOKS, M.D.,* Deputy Commissioner of the New York State Department of Health, Albany, N. Y., was recently elected President of the International Association of Milk Sanitarians, in Jacksonville, Fla.

GEORGE B. DAVIS, M.D.,† of Guilford, Conn., has been appointed Health Officer of Barren County, succeeding CHESTER R. MARKWOOD, M.D.,† of Glasgow.

CHARLES E. GILL, M.D.,† State District Health Officer for the Massachusetts Department of Public Health, at Westfield, Mass., has resigned and assumed his new duties as Deputy State-County Health Officer in Prince George County, Md., with headquarters at Upper Marlboro, Md.

DR. JAMES BERNARD LAWLER, of Vernon, N. Y., has been appointed Health Officer of the township except the city of Sherrill, succeeding DR. GARY M. LEWIS, who had served for 60 years except for a short period.

JOSEPH I. LINDE, M.D.,* of New Haven, Conn., has been appointed a member of the State Tuberculosis Commission, to serve the unexpired term of the late DR. STEPHEN J. MAHER.

DR. CHARLES RANSOM REYNOLDS, former Surgeon General of the

* Fellow A.P.H.A.
† Member A.P.H.A.

United States Army, who retired in June, 1939, has been named Chief of the Division of Tuberculosis Control of the Pennsylvania State Department of Health.

Central States

WENDELL C. ANDERSON, M.D.,† of Mentone, Ind., has been appointed Director of the District Health Department, covering Dubois, Spencer, Orange, Crawford, and Perry Counties, with headquarters in Huntingburg. He succeeds CHESTER A. HICKS, M.D.†

DR. MAURICE LINCOLN FISHER, of Mansfield, Ohio, has been appointed Medical Director of Tuberculosis Work in Richland County. A half mill tax levy to provide funds for the care of indigent tuberculosis patients becomes available in January.

ALICE H. MILLER,† of Gainesville, Fla., has been appointed Director of Public Health for the Tuberculosis Institute of Chicago and Cook County, succeeding ADELAIDE ROSS,† resigned.

DR. ALBERT GRAEME MITCHELL, of Cincinnati, Ohio, has been appointed a member of the Committee on Education of the National Foundation for Infantile Paralysis.

DR. GEORGE FREDERICK MOENCH, of Mount Victory, Ohio, has been appointed Health Officer of Delaware and Delaware County.

LEWIS C. ROBBINS, M.D., C.P.H.,† has been placed in charge of the District Health Unit covering Monroe, Brown, and Lawrence Counties, with headquarters in Bloomington, Ind. He succeeds HENRY G. STEINMETZ, M.D.,† who has received a fellowship in public health at Johns Hopkins University.

DR. WILLIAM K. RUBLE, of Wilmington, Ohio, Health Commissioner of Clinton County since 1921, has retired.

Southern States

DR. RICHARD M. ADAMS,† Health Officer of Ada and Pontotoc County, Okla., has been appointed Health Officer of Tulsa.

GEORGE M. ANDERSON, D.D.S.,† of Morgan, Ga., has been appointed Commissioner of Health for Dodge County, succeeding DR. LUTHER A. BRENDLE, of Eastman.

DR. CLARENCE L. AYERS, of Toccoa, has been appointed a member of the Georgia State Board of Health for a term of six years.

BENJAMIN S. BLACK, M.D.,† of Grove Hill, Ala., has resigned as Health Officer of Clarke County.

DR. ROBERT H. BOSTWICK, JR., of Indianola, Miss., has been made director of the Union County Health Department, succeeding DR. EDWIN M. BUTLER, of Liberty, who plans to enter private practice.

WALTER J. BROAD, M.D.,† of Montgomery, Ala., has been appointed Health Officer of Bullock County, succeeding DR. HUBERT R. OWEN, of Union Springs, who resigned to do postgraduate work at the University of Pennsylvania.

DR. REUBEN M. COBLIN, of Frankfort, Ky., has been appointed Health Officer of Franklin County, to succeed DR. EUGEN C. ROEMELE.

JESSE HILL CROUCH, M.D.,* has been appointed Health Officer of Henrico County, Va., succeeding DR. J. D. HAMMER, JR.

DR. OLIVER W. JENKINS, of Edison, Ga., has been named Health Officer of Terrell County, succeeding DR. CLAIR A. HENDERSON, of Dawson.

DR. HARDY A. KEMP, Professor of Bacteriology and Preventive Medicine at Baylor University College of Medicine, Dallas, Tex., has been appointed Dean of the University of

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* Fellow A.P.H.A.
† Member A.P.H.A.

Vermont College of Medicine, succeeding DR. JAMES N. JENNE, deceased.

JOSEPH AUGUSTIN LE PRINCE, Senior Sanitary Engineer, U. S. Public Health Service, Washington, D. C., retired September 1, after 25 years of continuous service.

DR. ALBERT G. LE ROY, of Lyons, Ga., resigned as Health Commissioner of Toombs County, effective September 25, to accept a similar position in Tift County, succeeding ROBERT H. HARALSON, M.D.,† of Tifton, who plans to engage in private practice in Calderwood, Tenn.

DR. JAMES H. LITTON, of Carbon, W. Va., has been appointed Commissioner of Health for Baldwin County Ga., succeeding DR. STUART P. VANDIVIERE, of Milledgeville.

DR. JACK R. MCMICHAEL, of Quitman, Ga., has been appointed a member of the Georgia State Board of Health.

DR. JAMES W. MILLER, of Greensburg, Ky., has resigned as Director of the Green County Medical Society to enter private practice.

DR. ROBERT C. PENDERGRASS has been appointed Director of a newly organized cancer clinic in Americus, Ga.

DR. SOLOMON P. ROBERTS, of Nowata, Okla., has been appointed Health Officer of Nowata County.

DR. EVERETT W. RYAN, of Canton, Miss., formerly Director of the Madison County Health Unit, has been transferred to Charleston to direct the Tallahatchie Department.

DR. ELMER R. SCHNAKE, of Newport, has been appointed Health Officer of Newport, Ky.

DR. STUART P. VANDIVIERE, formerly Commissioner of Health in Dodge County, Ga., has been appointed Commissioner of Health for Sumter County, succeeding DR. WILLIAM F. CASTELLOW, of Americus.

JAMES P. WARD, M.D.,† of Charleston, Miss., Director of Tallahatchie County, was appointed Director of the Washington County Health Department, effective October 15, succeeding DR. BENJAMIN F. HAND, JR., who resigned to engage in private practice in Greenville.

Western States

THOMAS H. BIGGS, M.D.,† of Chehalis, Wash., has been appointed District Health Officer for Grant and Douglas Counties, in Oregon.

DR. HENRY RUSSELL BROWN, of Watertown, S. Dak., was elected President of the South Dakota Health Officers Association at the meeting in October.

DR. WALTER W. BROWN, of Hardy, Ark., has been appointed Health Officer of Sharp County.

DR. JAMES F. HAYS, formerly of Augusta, Ark., Health Officer of Woodruff County, has been placed in charge of the health unit in Pope County, with headquarters in Russellville.

DR. ULYS JACKSON, formerly of Marshall, Ark., has been assigned as Health Officer of Boone County, with headquarters in Harrison.

DR. ALVA S. PINTO, of Omaha, Neb., has been appointed Health Officer of Omaha, to succeed DR. FLOYD H. KINYOUN, resigned.

DR. JOHN B. PORTER, formerly of Omaha, Neb., has been appointed Health Officer for Kitsap County, to succeed DR. THOMAS C. BALDWIN, of Port Orchard.

DR. WILLIAM J. QUINN † has resigned as Health Officer of Eureka, Calif., to accept a similar position with Humboldt County.

DR. ALVIE B. TATE, of Russellville, Ark., Health Officer in Pope County, will go to Woodruff County.

* Fellow A.P.H.A.
† Member A.P.H.A.

CONFERENCES AND DATES

American Association of School Administrators. St. Louis, Mo. February 24–29.

American Association of Social Workers (Delegate Conference). Grand Rapids, Mich. May, 1940.

American Congress on Industrial Health. Chicago, Ill. January 15–16.

American Library Association. Cincinnati, Ohio. May 26–June 1.

American Medical Association — 91st Annual Meeting. New York, N. Y. June 10–14.

American Orthopsychiatric Association —17th Annual Meeting. Hotel Statler, Boston, Mass. February 22–24.

American Public Health Association —69th Annual Meeting. Book-Cadillac Hotel, Statler Hotel, Detroit, Mich. October 8–11.

American Scientific Congress—8th. In connection with celebration of 50th Anniversary of founding of the Pan American Union. Washington, D. C. May 10–18.

American Society of Civil Engineers. Annual Meeting, New York, N. Y., January 17–19; Spring Meeting, Kansas City, Mo., April 17–19.

American Water Works Association. Kansas City, Mo. April 21–25.

Convention for the Revision of the Pharmacopoeia of the United States. Washington, D. C. May 14.

Council on Medical Education and Hospitals of the American Medical Association—36th Annual Congress. Federation of State Medical Boards of the United States will participate. Palmer House, Chicago, Ill. February 12–13.

Greater New York Safety Congress—Meeting with the Safety Congress. April, 1940.

Industrial Health — Second Annual Congress. Sponsored by the American Medical Association. Palmer House, Chicago, Ill. January 15–16.

International College of Surgeons—United States Chapter. 4th Annual Assembly. Venice, Fla. February 11–14.

International Heating and Ventilating Exposition—Sixth. Under auspices of the American Society of Heating and Ventilating Engineers, and coinciding with its 46th Annual Meeting. Lakeside Hall, Cleveland, Ohio. January 22–26.

Massachusetts Public Health Association. Golden Anniversary Meeting. Parker House, Boston, Mass. January 27.

Michigan Public Health Association. Detroit, Mich. October, 1940.

Mother's Day. May 12. Tenth annual nationwide campaign to make maternity safe—Maternity Center Association, New York.

National Conference of Social Work. Grand Rapids, Mich. May 26–June 1.

National Public Housing Conference. Washington, D. C. January 26–28.

National Social Hygiene Day—4th Annual Observance. February 1.

National Warm Air Heating and Air Conditioning Association. Cleveland, Ohio. January 22–26.

Pan American Union. Celebration of the Fiftieth Anniversary. Washington, D. C. April 14.

Smoke Prevention Association — 34th Annual Convention. Hotel Statler, St. Louis, Mo. May 21–24.

Southern California Public Health Association. Long Beach, Calif. January 24.

White House Conference on Children in a Democracy. Washington, D. C. January 18–20.